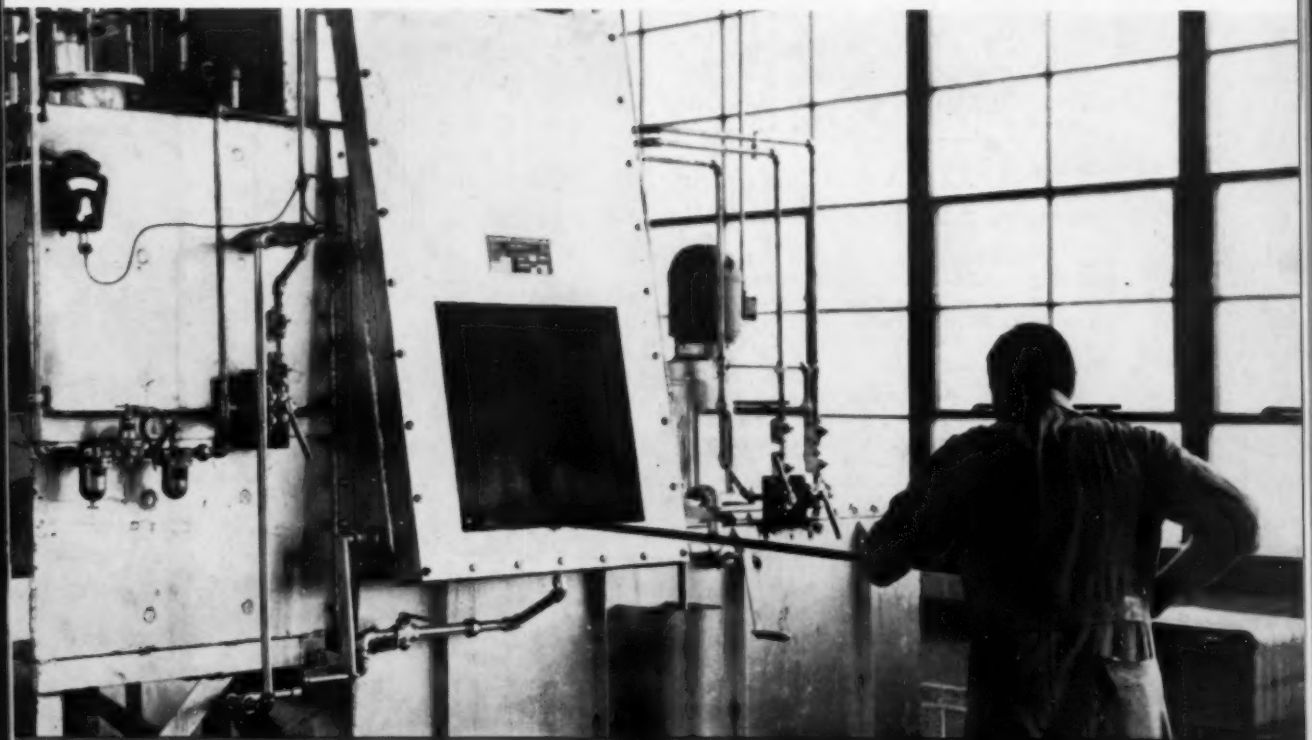


November 15, 1956

The **IRON AGE**

The National Metalworking Weekly



Pros and Cons of Heat Treat Stop-Offs P.131

Passenger Conveyors Move Into Industry P.91

What Election Means to Metalworking P.96

Digest of the Week P-2

***Move it above
-- have
more room below !***



**WHITING TRAMBEAM belongs in
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Production or warehousing operations move into *high speed* when Whiting Trambeam goes into action *overhead*. Trambeam systems lift products and materials up — quickly carry them wherever desired. No more traffic bottlenecks. No more handling "obstacle courses." Trambeam *increases* working or storage space while reducing handling costs.

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He's Paving the Way for a Good Drop Forging

Not all craftsmen paint pictures or make watches. Here's one whose artistry helps shape intricate dies for Bethlehem drop forgings.

That's a job requiring infinite patience, a skilled touch, and a world of experience. Bethlehem die-sinkers qualify on all counts, and the results of their craftsmanship are clearly evident in the finished forgings.

They're a capable group, these die men. But you could say the same thing for everyone concerned with Bethlehem drop forgings. In our fully inte-

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Yet Bethlehem prices and deliveries are fully competitive. It will be worth your while to investigate our services. May we have the opportunity to quote on your requirements?

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BETHLEHEM STEEL



Digest of the Week in Metalworking

Starred items are digested at right.

EDITORIAL

After the "Warm" War What? 7

NEWS OF INDUSTRY

*Special Report: Conveyors Move Men, Not Just Materials	91
*Fuel: Are There Enough Oil Country Goods?	93
*Marketing: Warehouses Sell More Stainless	94
*Government: What Election Means to Business	96
Business: Labor's Hours Are Buying More	97
*Manufacturing: Abrasives Star for Finishing	98
*Maintenance: Get Ready for Winter Now	99
*Marketing: Gearmakers Chalk Up Record Sales	100
Personnel: Iron Age Salutes	119
Iron Age Introduces	121
Metalworking Briefs	216

NEWS ANALYSIS

Newsfront	89
Report to Management	105
Automotive Assembly Line	108
This Week in Washington	113
*West Coast Report	115
*Machine Tool High Spots	117

TECHNICAL ARTICLES

*Pros and Cons of Heat Treat Stop-Offs	131
Modular Timer Controls Many Functions	135
*How to Impact Test Sheet Material	136
*Automate Forging Without Special Equipment	138
*Setup Controls, Records Strip Thickness	140
Handle Chips Efficiently for Shop Profits	142
*Chromium Plate Irregular Surfaces Uniformly	144
Technical Briefs	156

MARKETS & PRICES

*The Iron Age Summary—Steel Outlook	189
Steel Product Markets	190
Comparison of Prices	191
Iron and Steel Scrap Markets	192
Nonferrous Markets	196
Steel Prices	199

REGULAR DEPARTMENTS

Dates to Remember	13
Free Literature	148
New Equipment	178

INDEX TO ADVERTISERS	216
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Address mail to The IRON AGE
Chestnut and 56th Sts. Philadelphia 39, Pa.

NEWS DEVELOPMENTS

HUMAN CONVEYOR MOVES INTO STEEL MILL P. 91

Installation at Weirton Steel is first of its kind in a metalworking industry.



(Goodyear Tire and Rubber Co. photo)

Continuous belts are used to carry employees up three and a half flights from mill floor to new consolidated locker room. It relieves congestion on stairways.

IS OIL COUNTRY GOODS CAPACITY ADEQUATE? P. 93

Petroleum executive contends lack of tubular goods holds up drilling programs, admits conversion deals to obtain necessary materials. Meanwhile, U. S. demand for oil soars in wake of Middle East crisis.

WHAT'S AHEAD FOR BUSINESS IN NEW CONGRESS P. 96

New Congress is expected to operate very close to legislative pattern set by the now expiring Congress. Few antagonistic laws seen.

ABRASIVES DEMONSTRATE FINISHING VERSATILITY P. 98

Working demonstrations at Second National Metal Finishing Show indicate vast ranges of finishing jobs—from stock 4 ft wide to small turbine components—which can be handled by coated abrasive belts.



AS THE JOB goes into the heat treating furnace, it's safe to say "so far—so good." But the quality of the work coming out is often dependent upon the effectiveness of a heat-treat stop. The article on p. 131 tells why, as well as which kinds of stop-offs to use. (Surface Combustion Corp. photo)

IT'S TIME TO GET READY FOR WINTER

P. 99

Snow, ice and extreme cold will be the main enemies of your plant this winter. But there are numerous methods for combating these adversaries, thus keeping production going, raw materials moving in and finished products moving out. If snow clearance equipment is not owned it may be hired through contractor companies.

FEATURE ARTICLES

PROS AND CONS OF HEAT TREAT STOP-OFFS

P. 131

Choosing the right heat treat stop-off is a decision that can directly affect costs, product quality, performance. How about copper plate? Or some of the proprietary paints that can be readily brushed on or sprayed? Here's a rundown on some stop-offs you'll want to consider. What they're like, how they work, where they can and can't be used are some of the questions investigated.

HOW TO IMPACT TEST SHEET MATERIAL

P. 136

An apparent lack in impact testing of sheet material has been standard apparatus for determining impact strength. This is a relatively inexpensive rig that attempts to fill that gap. Simple in design, the setup can test specimens of varying length and notch geometry. Standard or modified specimens may be used.

AUTOMATE FORGING WITHOUT SPECIAL EQUIPMENT

P. 138

Without investing in specially designed equipment, one plant increased production from 135 to 400 completed forgings hourly by automating its five-step upsetting operation. An automatic loading and transfer mechanism was built and integrated with present forging equipment.

MILL SETUP CONTROLS, RECORDS STRIP THICKNESS

P. 140

Rolling alloy and stainless strip 0.005 to 0.040-in. thick, this mill gets close control automatically. System gages thickness, makes tiny adjustments and prints a record of the entire coil. Features include x-ray gages and automatic control of both screwdown and back tension.

CHROMIUM PLATE IRREGULAR SURFACES UNIFORMLY

P. 144

Anodes closely adjacent to the plating surface contribute to the highly uniform plating thicknesses possible on the irregular contours of gun tube bores. Higher amperage and bath temperature help also. Internal chromium plate is uniform, very bright, without surface irregularities or cracks through to basis metal.

MARKETS AND PRICES

WAREHOUSES INCREASE PERCENT OF STAINLESS SALES

P. 94

Survey indicates almost one-third of stainless products are sold through distributors. In two products, sheets and plates, they account for more than 50 pct of all sales. Study clarifies the stainless marketing picture. Shows end uses are much more diversified than previous data had shown.

GEARMAKERS CHALK UP RECORD SALES

P. 100

Demand for smaller, lighter, stronger and harder gears is souping up gear-making technology. Military and aircraft orders require gears not known to be obtainable a decade ago. It adds up to an estimated \$948 million year for the power transmission industry in 1956.

METALS WILL SHARE IN AIRCRAFT BONANZA

P. 115

As plane industry zooms ahead in next fifteen years look for more metal-working activity on Coast. Farwest builders will get bulk of orders for commercial, military planes and guided missiles.

METAL CUTTING TOOLS SLICE UP BIGGER PIE

P. 117

President of National Machine Tool Builders Assn. tells metal cutting tool makers their industry has increased volume at twice the overall national rate. Record of past five years indicates future business could average \$1 billion a year.

INTERNATIONAL TENSIONS SPUR STEEL DEMAND

P. 189

Delicate state of international relations forces steel buyers to take a closer look at inventories. Auto producers are tightening up on their orders. Result: A general firming in steel market outlook.

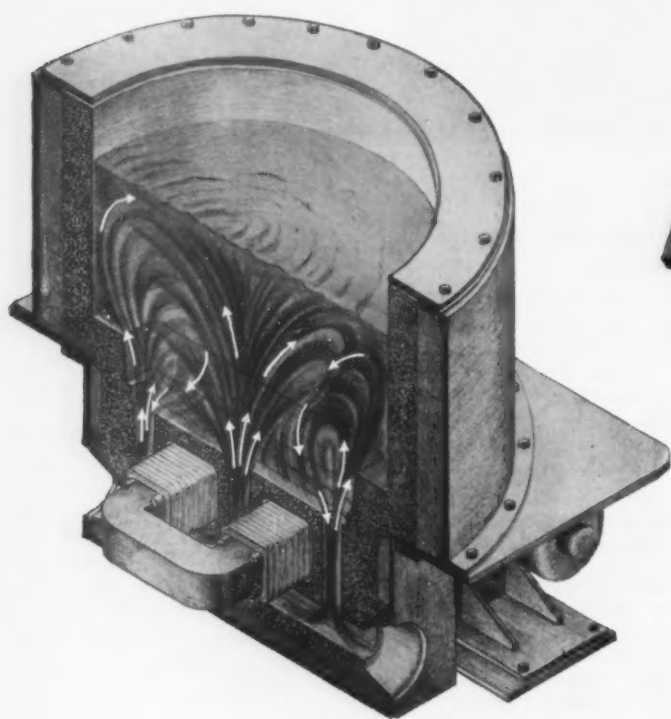
NEXT WEEK:

HOW CERAMICS FIGHT WEAR PROBLEMS

Ceramic materials are playing an important role in the battle against wear. Some are actually cheaper than special alloys; some wear better. Next week's feature brings you up-to-date on many of the ceramics now available and their uses.



The Furnace that Stirs Itself!



TWIN COIL INDUCTORS

Lead Non-Ferrous Melting

The sectional view above shows the twin coil stirring action of the 100 kW Ajax-Tama Wyatt 60 cycle induction furnace. Heat induced in the secondary channels below is conveyed throughout the melt by electromagnetic circulation as shown by the arrows. The 100 kW furnace shown here is one of a family of twin coil furnaces available today for melting rates from 300 to 10,000 lbs. per hour.

ELECTROMAGNETIC PRESSURE CIRCULATES MOLTEN METAL

— In this 60 Cycle —

AJAX TAMA-WYATT
Induction Furnace

Heat is generated only in the melting channels. Controlled stirring (*neither too much nor too little*) guarantees uniformity of metal temperature and alloy composition and also leads to efficient melting of light scrap. Tiresome puddling is eliminated. The metal is held entirely in an inert refractory lining. The atmosphere is cool and free from contaminating gases.

**No Other Method
Enables such Completely**

CONTROLLED MELTING

Today, AJAX builds a complete line of these time-tested furnaces in standard sizes up to 333 kW for the dependable melting of aluminum, brass, copper and zinc. Units for special applications are carefully engineered to specifications.



For Further Information, Send For Bulletin R-43

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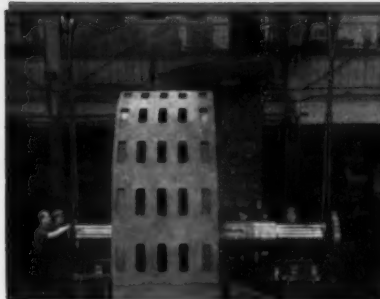
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INDUCTION MELTING FURNACE

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Two ATLAS Type 1, 8-part Round-Braided Slings handling generator unit.

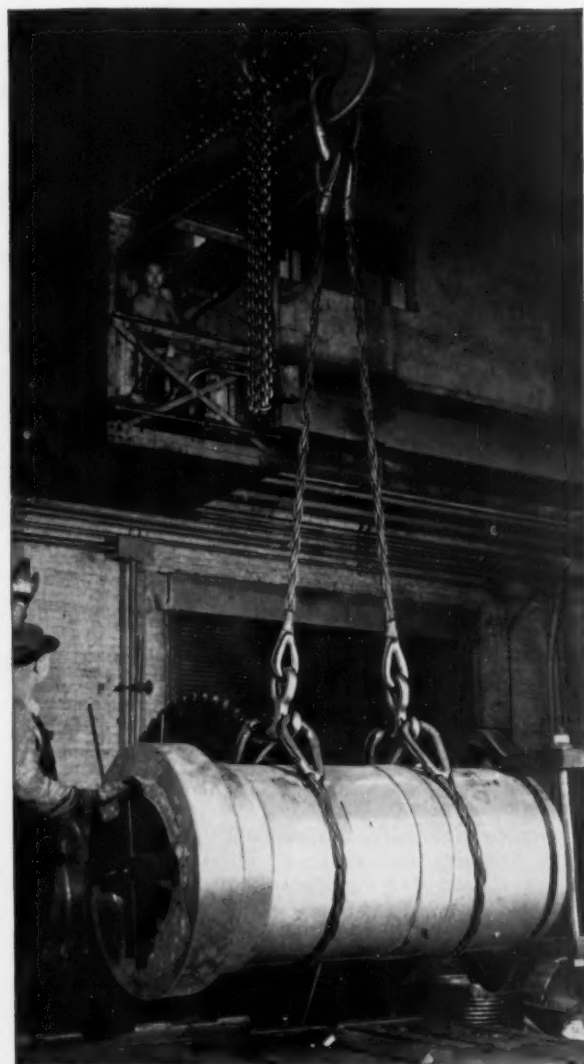


ATLAS Type 1, 8-part Round-Braided Sling used in Figure 8 hitch for handling ship propeller 22 ft. in diameter and weighing 71,500 lbs.



Two ATLAS Type 5 Whip Slings used with an assembly E Sling centering roll in lathe.

Material handling made safe, fast, and easy with BALANCED SLINGS!



ATLAS E-2 with Anchor hooks and Type 5 Whip Slings.

The balanced braided construction of ATLAS Slings results from Macwhyte's exclusive method of braiding endless right and left lay ropes. This method of braiding provides a balanced sling for safe, easy handling of a wide variety of equipment.

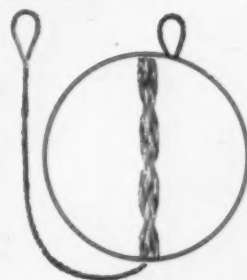
Because ATLAS slings are so lightweight and flexible, they are easy to use and save handling time.

Feel free to ask us for recommendations.

We will also make slings to your specifications.

Here's ATLAS balanced braided sling construction

- 1 One right lay and one left lay wire rope are each spliced endless.
- 2 These ropes are hand-braided to form a round sling body.
- 3 All ropes in the body react in the same manner when loaded and each rope carries an equal share of the load.
- 4 These features produce a lightweight, flexible, kink-resisting sling that hugs the load for safe and economical handling.



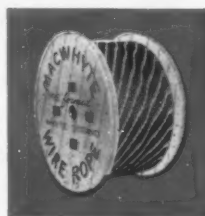
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"Here's where Stainless makes the difference"

"Does the increased use of Stainless Steel mean anything to you?" we asked the head of the Used Car Department of an Ohio agency. "It makes a big difference," he said and proceeded to point out that a trade-in with stainless trim and accessories almost always commanded a higher price than one without. "The reason is readily visible right here," he said and pointed to the grille of a car sitting in the lot. "Notice how we were able to bring the stainless parts back as good as new. Now, notice the trim section, not stainless, that is pitted and discolored. Nothing we could do, and it detracts from the value of the car. In my opinion, the increased use of Stainless is the greatest thing

that could happen to the used car business."

Leading automotive designers recognize this fact—that's why every year more parts are fabricated of Stainless Steel—much of it from the mills of Sharon—where buyers know they can expect consistent quality plus the industry's finest finish.

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SHARON, PENNSYLVANIA

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and the Engineering Index.



November 15, 1956

EDITORIAL

After the "Warm" War What?

♦ FOR A WHILE, part of the free world slipped back to force, double talk, balance of power changes and holier-than-thou attitudes. This aberration on our side was temporary. It had to be. Any pique we had about events has been pushed to the background.

Recent snide remarks that we were "on the side of the Russians" is crazy talk. It springs from people who were out to lunch when the brains were distributed. Russia will continue to violate every known rule of decency and human dignity.

The Middle East and Eastern Europe situation is serious. The "warm" war stage is here. No one can tell for sure if the Reds are bluffing. Great Britain and France took a chance that Russia would not start a big war.

The Communists will not operate in an expected manner. They can—and may at any time—create more trouble for the free world by methods foreign to our thinking. That is why the pressure is on—or should be on—for complete readiness to meet any emergency.

Whether it is soft-pedaled in Washington or not, you can be sure that things "have changed." Snail's-pace in missiles and aircraft and talk about cutting military forces have been relegated to past history. The international situation won't cool down quickly.

This nation is committed to guns-and-butter for simple reasons. It can and must have both in order to survive economically. All-out guns would wreck our economy. All-out butter would kill us off while others plotted our downfall.

Your plans for 1957 will have to make room for bigger defense spending, postponement of some tax relief, greater investment in plant and equipment and a close watch on your inventories. If the Middle East situation appears to calm down it will be misleading. Deep-seated forces are churning the whole world picture.

Imponderables include the jitteriness of Russian bosses who may mistake free world aims and mild disagreements. Because of their own batch of satellite troubles, they could blunder tragically. They do not think as we do: we must be ready for anything.

Any price to maintain our strength is worth the sacrifice. Freedom as we want it is cheap no matter what the tag says. Free peoples stick together or they perish one by one.

Tom Campbell

EDITOR-IN-CHIEF

TRY THE MOTCH & MERRYWEATHER

Combination

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**HIGHER PRODUCTION,
ACCURACY, PROFITS**

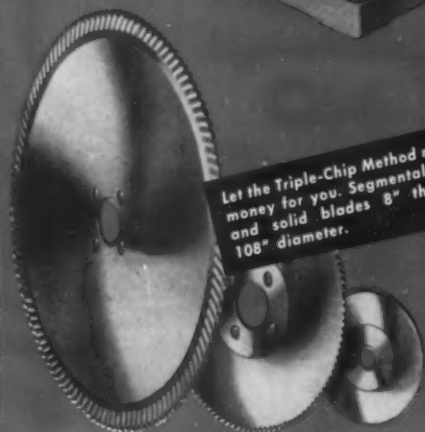


Five sizes of M & M circular sawing machines cut off stock, ferrous or non-ferrous, from 1/4" through 43".

"Own your own". For many reasons — time, production, accuracy, cost—it pays to sharpen your own blades.



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Get the most from your cut-off dollars. That means using the Motch & Merryweather circular sawing combination. There's no other way . . . With your own M & M automatic grinder you save days of time, save transportation and other expense, use blades longer, and control work quality . . . Let a Motch & Merryweather specialist demonstrate.

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CLEVELAND 13, OHIO

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dear editor:

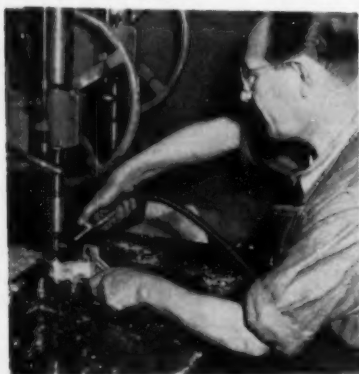
letters from readers

Safety Man's Burden

Sir:

Mr. J. E. Hyler in his article on p. 104 of your November 1, 1956 issue offers a picture with the statement—"Drilling machine operator uses efficient blow gun to clear chips from immediate work area."

Why burden the long and difficult campaign of safety men to reduce and control wanton and hazardous use of air hoses?



The operator as pictured should use a brush. He should also be wearing safety glasses.

This is submitted as a helpful thought. *R. A. McVety, Safety Director, Remington Rand, New York, N. Y.*

We can make no excuses for the lack of safety glasses. On the use of a brush to clear the chips, I imagine you would have a little argument with the time-study people and with the union.—Ed.

Drawing Lubricants

Sir:

Kindly furnish eight copies of the October 25 feature article "Save By Knowing Your Drawing Lubricant Ingredients."

This is a very informative article and we will distribute these articles

to the people who would be interested. *R. J. Celek, Steel Buyer, Whirlpool-Seeger Corp., Clyde Div., Clyde, Ohio.*

High-Temperature Paint

Sir:

In your August 16th issue of IRON AGE (p. 49), you mentioned a new high-temperature paint developed by the Army Corps of Engineers that would withstand temperatures to 1400 F. We are interested in evaluating the coating described therein for possible application in our engines.

Can you supply us with the name of the manufacturer or distribution source of the paint so that we may contact them for detailed information? *L. D. Flood, Materials Development Laboratory, Pratt & Whitney Aircraft, Div. of United Aircraft Corp., East Hartford, Conn.*

For more information write Emil J. York, Senior Project Engineer, Engineering Research and Development Laboratories, Fort Belvoir, Va.

Training Aid

Sir:

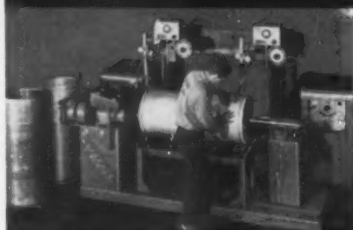
I have just completed reading the number 6 in your series of "How to Get More for Your Metalworking Dollar—Inspection" and in my opinion it is one of the best articles I have ever read.

It has impressed me so much that I would appreciate receiving six copies for routing to our top people.

And if I may make another request would it be possible to mail to me copies of the other articles in this series—1 through 5? *A. L. Franzolino, Director of Training, Temco Aircraft Corp., Dallas, Texas.*

Copies are on the way.—Ed.

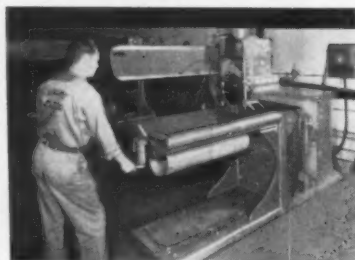
how to make
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welding a
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operation**



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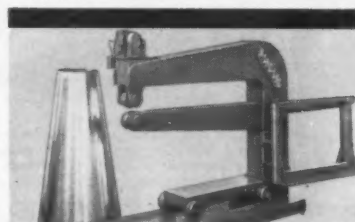
automatic welding fixture

Designed for circular welding of components with automatic chucking and ejection of parts and transfer. Chuck expands internally for sizing. Surface speed to 300' per min.



LONGITUDINAL automatic fusion butt welding fixture

Hold-down fingers with "toe touch" control lock parts in position for welding. Back-up mandrell with up to 6 copper inserts permits fast job changes. Handles all weldable metals .005 to 1" thick and lengths from 2' to 12'.



ROLL PLANISHING FIXTURE

Cold-rolls and smoothes fusion welds (circ. & longit.) under controlled pressure up to 10 tons. Handles 1 1/4" to 10" dia. and lengths to 16'.

Write today for further information
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FIXTURES & POSITIONERS

"guides the arc to the mark"

An **O.B.I.** that takes on
the **BIG JOBS**

Ask Warner about their New **CLEARING**

Here's a big press—200 tons capacity—with big press features combined with the convenience of operation and easy feeding found in every Clearing O.B.I.

Warner Electric Brake & Clutch Company, Beloit, Wis., uses this press for drawing and forming parts for their broad line of electric clutches and brakes. They wanted quick changeover from job to job, versatility in feeding, the ability to blank or draw, automatic lubrication and variable speed drive. Their 200-ton Clearing O.B.I. gives them these things and more—hands-off maintenance, air cylinder counterbalance, motorized slide adjustment and air friction clutch and brake.

If you want a high production machine that can take on the big jobs, ask Warner about their Clearing O.B.I. Better still, ask Clearing engineers. They'll help you select the machine that can give your manufacturing operation exactly the kind of support it needs. Call in Clearing. There'll be no obligation.



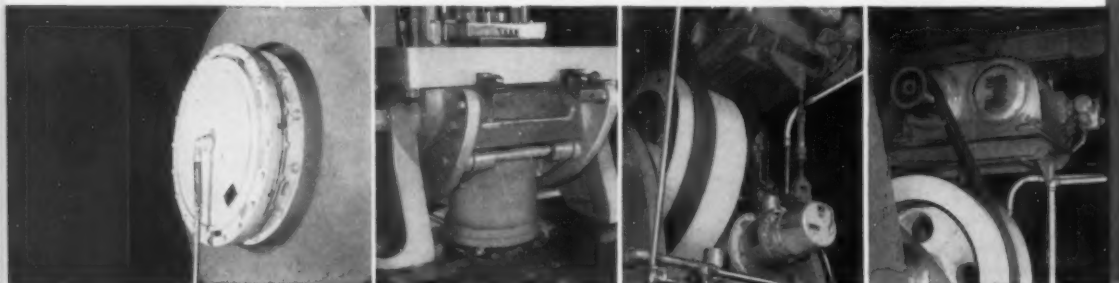
Write for complete catalog on Clearing O.B.I.'s.

This 200 ton press is equipped with Clearing's low-maintenance air friction clutch.

Clearing 31 ton cushion provides blankholding or lift-out pressure as required.

Each press stroke automatically lubricates the machine. Power slide adjustment is also provided.

Variable speed drive provides high speeds for blanking—medium speeds for drawing operations.



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fatigue cracks

TV in Industry

Closed circuit television has gone over in industry about as well as color TV has with the American public. There are some nice applications—but not too many—though it appears to have a rather promising future.

Biggest users now are steel mills, where you'll find about 40 pct of all U. S. industrial television installed. They use it for such chores as controlling billet and bloom length and other material handling applications.

Meanwhile we've heard of a new type of TV—a camera which can be remotely controlled from as



CLOSED CIRCUIT TV shows boardroom scene (top) by remotely controlled camera.

much as 10 miles away with a small hand-held "console" much like you control a big milling machine.

The demonstration we saw was at Lukens Steel where newsmen got a TV picture of a meeting of the management committee while management saw newsmen (UGH!) on a screen in their meeting room. From the visitors' room the operator was able to traverse right or left, up or down and move the various officials into close-ups—with no operator on the camera

in that room. We also saw the same camera set up on a heat treating line control pulpit where it could pick up any part of the control panel and read any dial, check any switch—all with nothing more than normal lighting.

Jerrold Electronics, Philadelphia, would like to hear about any possible industrial uses you can think of. Jerrold's principal business is picking up commercial TV signals and piping them over their own cables to homes in areas that can't otherwise receive TV. There are some 500 areas in the U. S. which get their TV by wire; users pay an installation charge and a monthly fee like you pay the telephone company (whose poles they use).

One of our editors has just visited a plant where there are no less than six TV cameras on one heat treating line—and three on an adjacent shear line. You'll be getting a photographic report on this in the not too distant future.

Not all applications are for technical uses. We know of one where scrap is loaded in rail cars by TV.

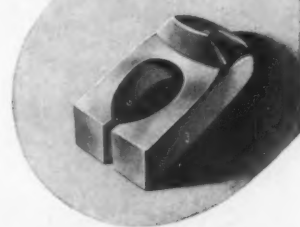
New Puzzler

Many thanks to Dave Jaffe, Jaffe Iron & Metal Co. for this one.

On this island there are only two kinds of people, green people and purple people. The green people always tell the truth and the purple people always lie. A blind man approaches a group of three men who are talking. He asks the first man what color he is. The first man told him but the blind man wasn't close enough to hear his answer. So he approaches the second man and asks "What color did the first man say he was?" The second man replied, "The first man said he was purple." The blind man asked the third man, "What color is the second man?" The third man said, "The second man is purple."

What colors are two of the men?

what's the scoop?



it's SEYMOUR NICKEL SILVER of course!



Take a close look at one of the "scoops" — or hooks — in the slide fasteners which play a key role in your daily living.

The best slide fastener scoops are made of Seymour Nickel Silver wire. They are formed on high speed machines that produce up to 300,000,000 tiny parts every day. Yet, so precise is the operation that tolerances are held to half-thousandths of an inch!

Because its uniform composition and temper enable it to undergo precise forming on high speed machines, Seymour Nickel Silver meets these requirements perfectly. It will not discolor materials — it is long wearing and corrosion resistant — it has the necessary eye appeal. Best of all, it has the natural lubricity which makes fasteners work smoothly and without sticking. These enviable qualities have helped make Seymour the leading supplier of nickel silver wire for the slide fastener industry.

Beyond that, Seymour's readiness to produce nickel silver alloys in strict conformity to users' needs has prompted many manufacturers to say . . . "SPECIFY SEYMOUR — You KNOW it's good!"



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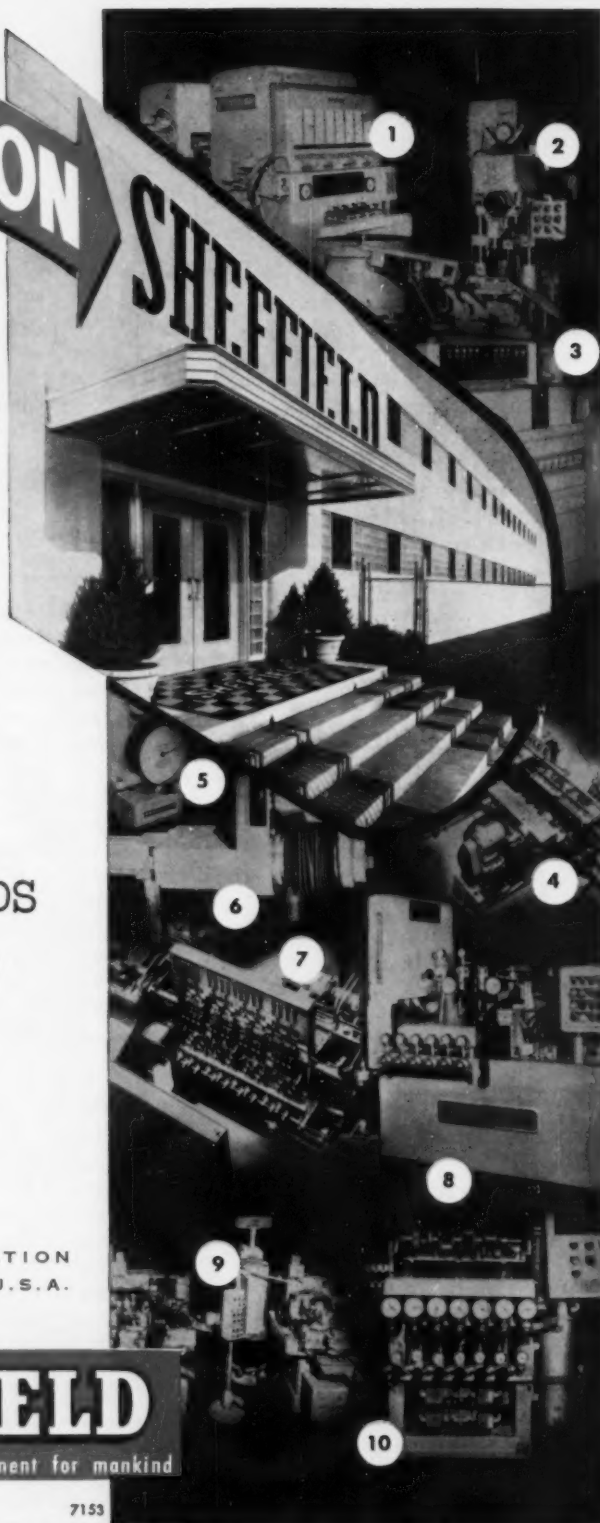
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- 8 Controlling 12 grinding machines
- 9 Controlling bore size of pinion blanks
- 10 Automatic gaging of crankshaft main bearings



dates to remember

NOVEMBER

The American Society of Mechanical Engineers—Annual meeting, Nov. 25-30, Statler Hotel, New York. Society headquarters, 20 W. 39th St., New York.

Wire Reinforcement Institute, Inc.—Fall meeting, Nov. 26-27, The Jung Hotel, New Orleans, La. Society headquarters, National Press Bldg., Washington 4, D. C.

Society for the Advancement of Management—Annual operations research conference, Nov. 26-30, Hotel Commodore, New York. Society headquarters, 74 Fifth Ave., New York.

EXPOSITION

Third International Automation Exposition—Nov. 26-30, New York.

DECEMBER

Institute of Appliance Manufacturers—Year-end conference, Dec. 3-4, Netherlands Plaza Hotel, Cincinnati, O. Society headquarters, The Shoreham Hotel, Washington, D. C.

American Institute of Mining, Metallurgical, and Petroleum Engineers—Annual conference, Dec. 5-7, Morrison Hotel, Chicago. Society headquarters, 29 W. 39th St., New York.

American Institute of Chemical Engineers—Annual meeting, Dec. 9-12, Statler Hotel, Boston. Society headquarters, 25 W. 45th St., New York.

The Material Handling Institute—Annual meeting, Dec. 10-11, Biltmore Hotel, New York. Society headquarters, One Gateway Center, Pittsburgh, Pa.

JANUARY

Institute of Scrap Iron & Steel Inc.—Annual convention, Jan. 13-16, Eden Roc and Fontainebleau Hotels, Miami Beach, Fla. Society headquarters, 1729 H St., N. W. Washington, D. C.

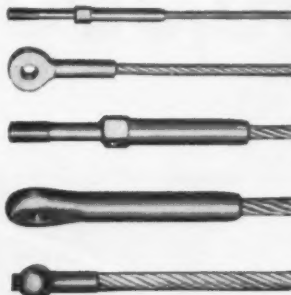
Society of Automotive Engineers, Inc.—Annual meeting, Jan. 14-18, The Sheraton-Cadillac and Statler Hotels, Detroit. Society headquarters, 29 W. 39th St., New York.

The Society of Plastics Engineers, Inc.—Annual national technical conference, Jan. 16-18, Hotel Sheraton-Jefferson, St. Louis, Mo. Society headquarters, 34 E. Putnam Ave., Greenwich, Conn.

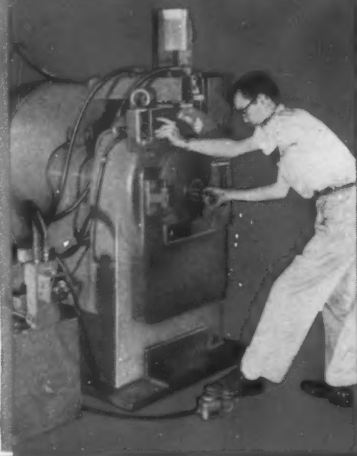
Compressed Gas Assn., Inc.—Annual meeting, Jan. 21-23, Waldorf-Astoria, New York. Society headquarters, 11 W. 42nd St., New York.

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Hydroforming produces a bond that is capable of withstanding FULL RATED CABLE STRENGTH.

This special modification of rotary swaging permits varied steel fittings to be fastened to the ends of control cable quickly and permanently by flowing the metal of the fitting around the cable strands. The Fenn Model 2H Hydroformer, in use at Sikorsky Aircraft, Stratford, Connecticut, produces cable assemblies for both the main and tail rotors, engine and brake controls, and reduces tubing for push-rod controls for helicopter flight systems.

Die closing is controlled automatically in the hydroformer by a pair of hydraulically actuated wedges. These same wedges allow the dies to open during operation to permit the insertion or withdrawal of fittings of various sizes and shapes. A whole new field of application has been opened by the hydroforming process and undoubtedly includes the answer to your assembling problem. Write for Catalog SM56 for full information.



SWAGING

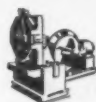
may have important advantages and savings in the manufacture of your products. Fenn engineers are at your service.



Precision Rolling Mills



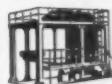
Turbs Heads



Wire Shaping Mills



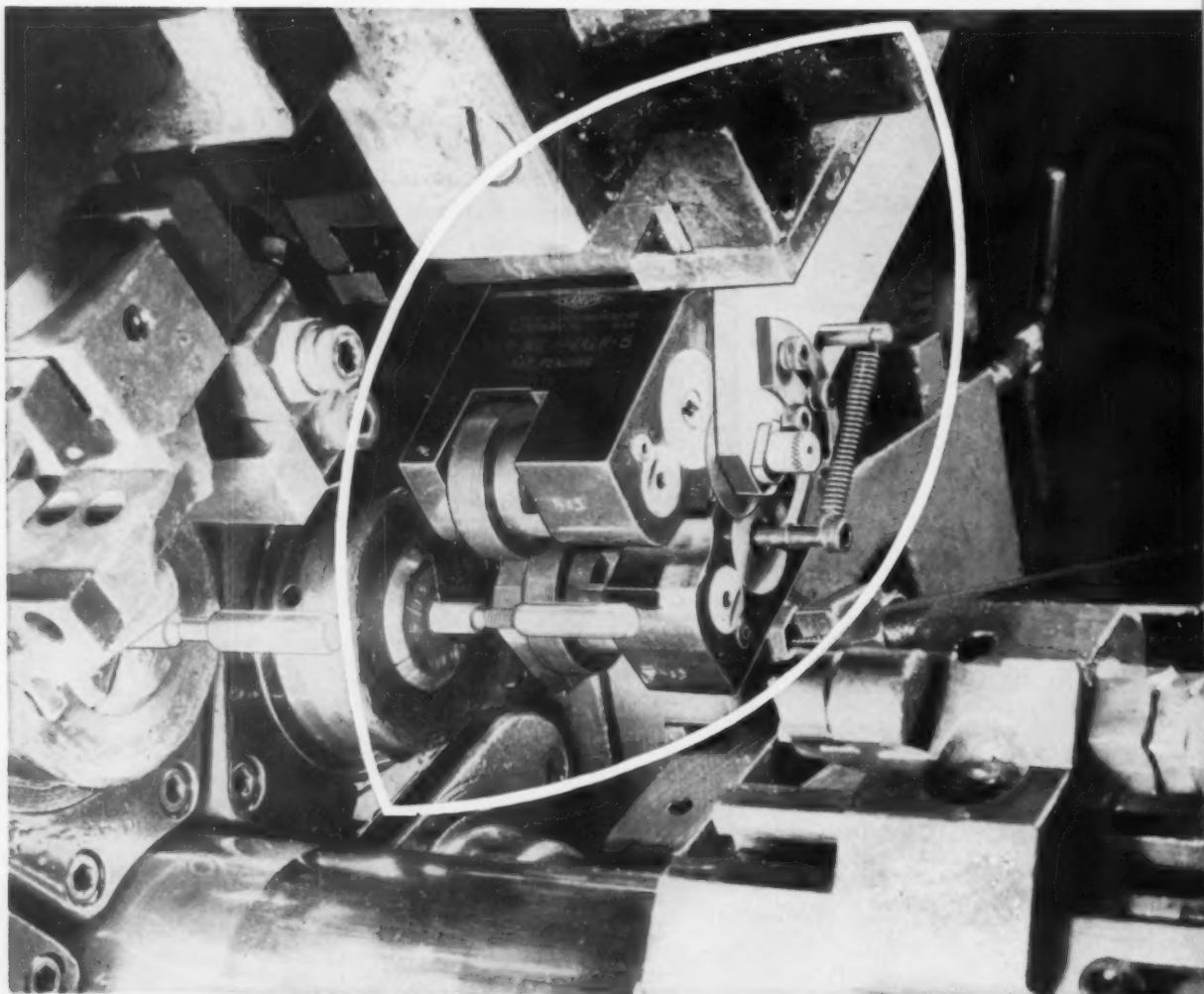
Swaging Machines



Wire and Tube Drawing Machines

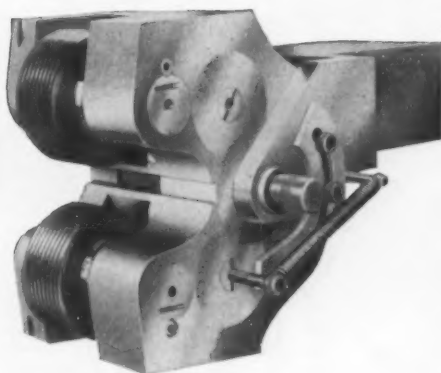
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with 1 set of Rolls



The economy of LANDIS Thread Rolling Attachments due to long roll life is being demonstrated in the production of studs at the M & S Morenci Corporation in Morenci, Michigan.

#10-32 pitch NF threads, .350" long, are rolled on 1020 screw stock using a #14 GA LANROLL Attachment on a 9/16" Acme-Gridley Automatic. The Attachment is operated in the 4th position, rolling next to the collet .030" back of the shoulder, and threads are held to $\pm .00025$ " on the pitch diameter. 1,100,000 threads have been produced to date with the original set of roll dies. Another Lanroll Attachment later placed in operation on the same job has to date produced 500,000 threads with its original rolls.

This long roll life is a result of the basic design of the Lanroll Attachment incorporating patented new principles. A degree of stabilization never before obtained in a tool of this type is ensured between the workpiece and the attachment. Open construction allows the use of thread rolls of the maximum diameter, distributing wear over an increased area. The accuracy and wear-resistance of the rolls themselves is the result of more than 50 years experience in the manufacture of threading tools. These rolls are precision-ground to produce uniform, accurate threads of the highest quality.

LANROLL Attachments are made in five sizes for use on bar automatics and turret lathes to roll both fine and coarse pitch threads to Class 4 tolerances. Quick and easy set-up changes assure operation of the attachment for every size within its range as though it were exclusively engineered for the particular work being threaded. The M & S operation shown here is an example of this set-up simplicity. Using only the handbook furnished with the Attachment, a satisfactory production set-up was made by a set-up man with no previous thread-rolling experience.

For more detailed information on construction and many exclusive features, send specifications and ask for Bulletin G-96.

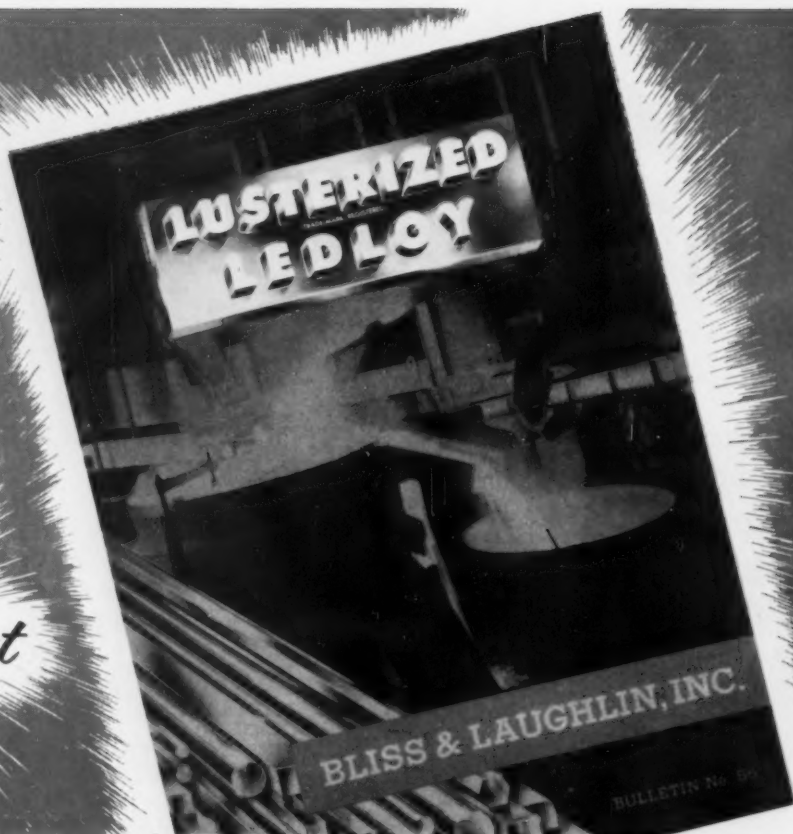
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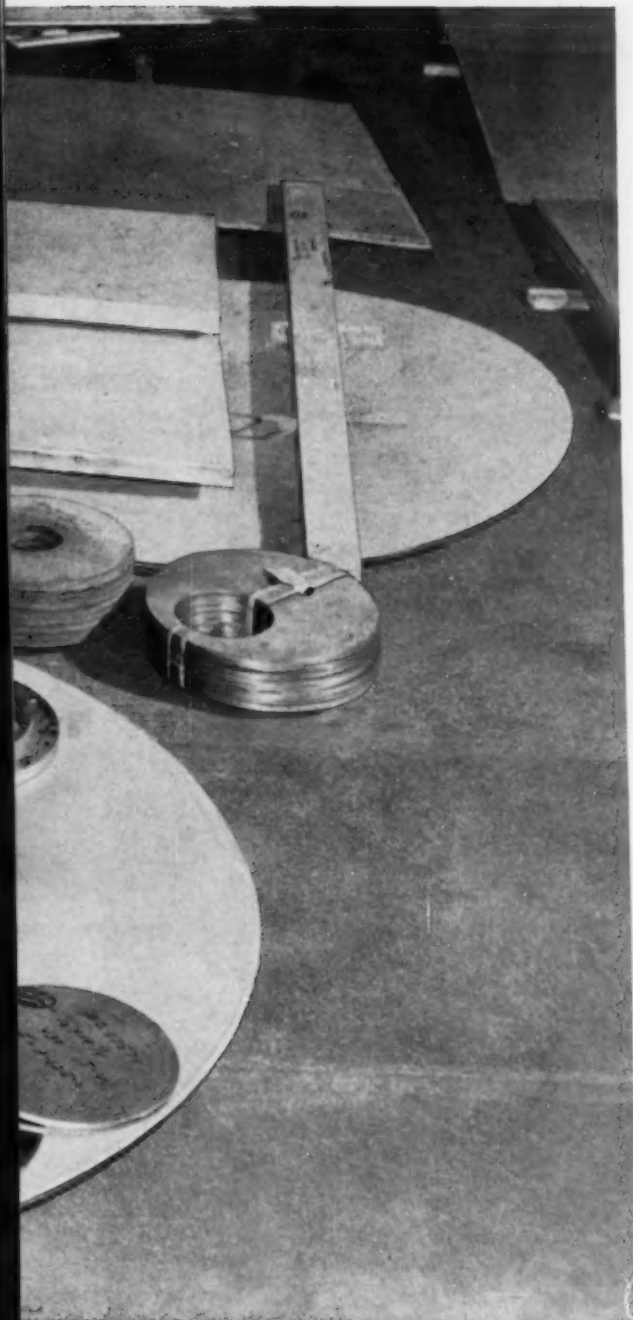
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for new "TOUCH of GOLD" economy
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You Can SEE The Difference! The new Norton 44 ALUNDUM abrasive (at right) differs definitely in appearance from ordinary aluminum oxide abrasive. The finer grain structure of "44" indicates its much denser, tougher composition. And the money-saving performance of this modern new abrasive is just as easy to spot — every time 44 ALUNDUM wheels go to work for you.



In new 44 ALUNDUM abrasive Norton brings you a combination of grinding quality, versatility and economy never before equalled in a non-premium abrasive.

We want to emphasize that point. Although the new "44" is non-premium priced, right there its resemblance to any ordinary aluminum oxide abrasive ends abruptly. It is definitely different and better in every way.

"44" is made differently, by a special Norton-developed electric furnace process that results in extreme toughness and ruggedness.

"44" performs differently. Compared to ordinary aluminum oxide abrasive wheels, the new 44 ALUNDUM wheels cut faster and last longer. They finish better and do more work per wheel. In your conditioning operations on alloy steel these "Touch of Gold" advantages mean improved product quality, higher production rate and lower grinding costs.

"44" is job-proved. Over 1100 different tests were made on the new 44 ALUNDUM wheels, in plants of all kinds throughout the country. Here are some typical steel mill reports:

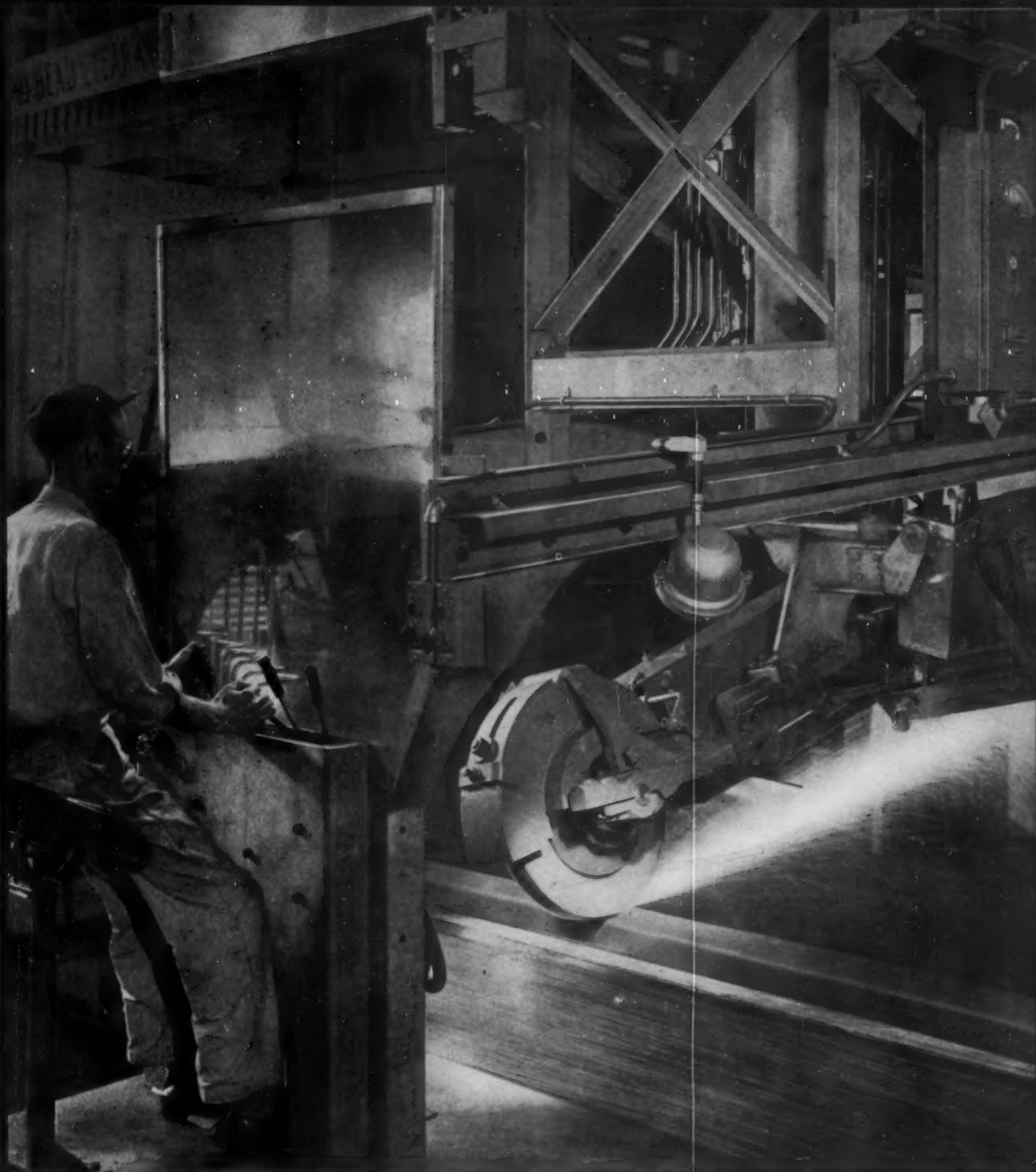
• "Faster cutting, better finish, much less burn."

• "Excellent on 431 stainless steel, giving exceptional cut without appreciable breakdown."

Adding Up

"44" is a real work-horse abrasive that delivers thoroughbred performance. On any job for which you're now using ordinary aluminum oxide wheels, the new 44 ALUNDUM abrasive with BZZ bond will give you better results. Your operators will like these wheels' faster, freer cutting action that means easier handling — and their extra toughness that means greater safety. And you'll like the way they cut grinding costs measured by any standards — in terms of tons ground, or pounds of metal removed per wheel, or man-hours per ton ground.

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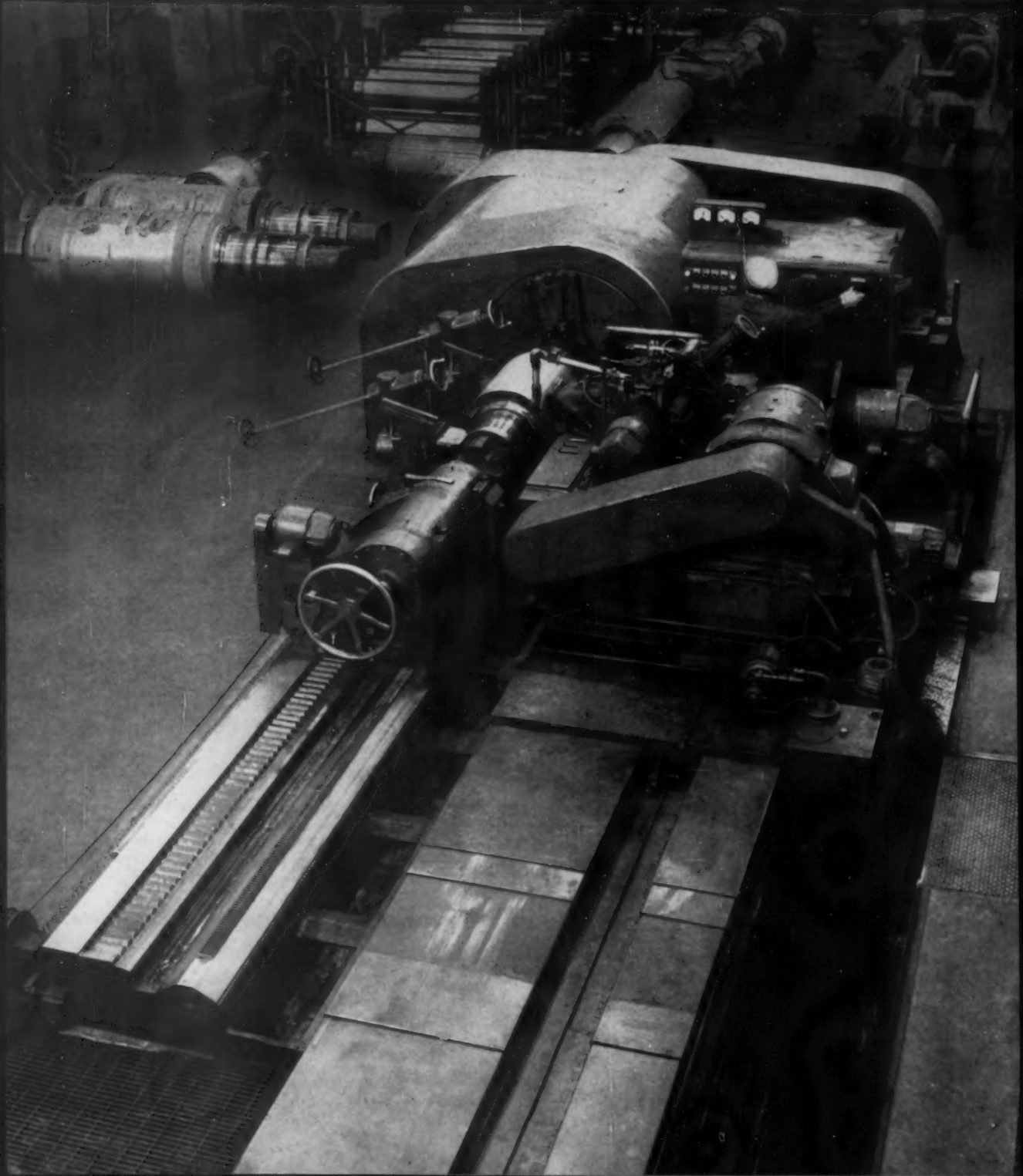
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Power movement of grinding wheel head
Ample power to start heavy rolls



Reflection on roll demonstrates mirror finish grinding done on Landis Type 30 Roll Grinders.

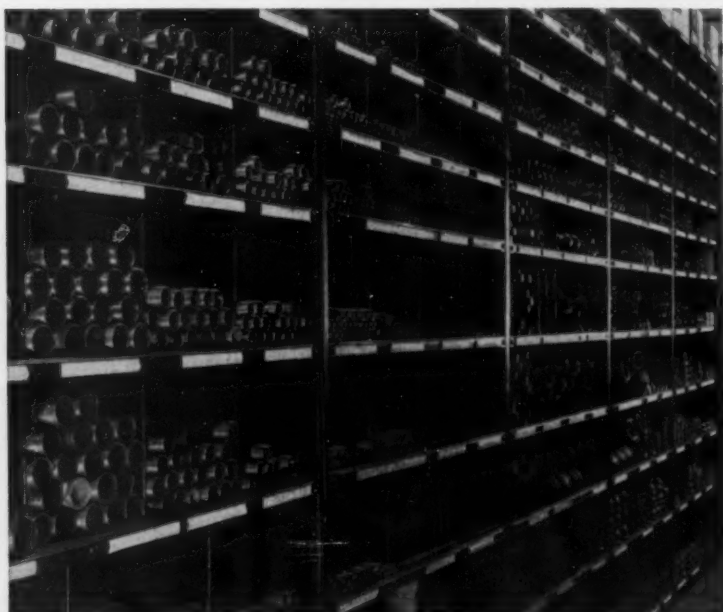
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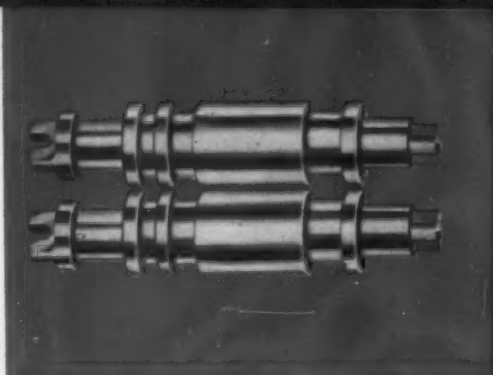
blooming-slabbing

operations

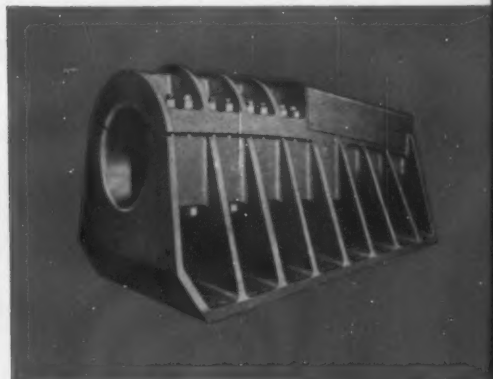
In operation as an intermediate mill for subsequent rolling, this rugged Continental 40-inch reversing blooming-slabbing mill is providing excellent performance in the United States Steel's Fairless Works.

Variations of the basic design of this mill are built by Blaw-Knox to serve as break-down mills for billet and bar mills, rail and structural mills, and merchant mills.

Blaw-Knox designs and builds complete rolling mill installations—assumes undivided responsibility from preliminary engineering to satisfactory operation. At any time we'll be glad to discuss your plans with you.



ROLLS—iron, alloy iron and steel rolls for all types of rolling mills.



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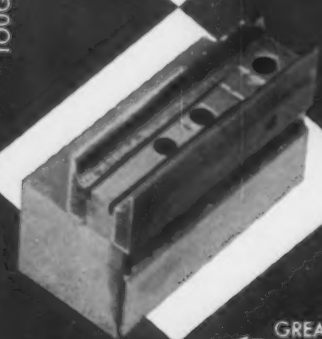
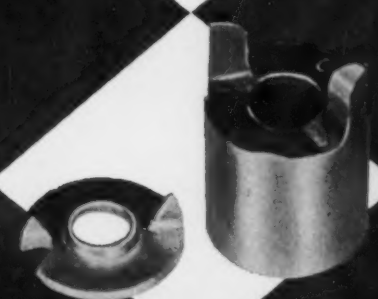
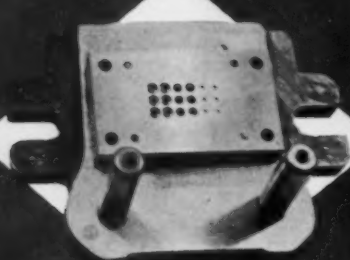
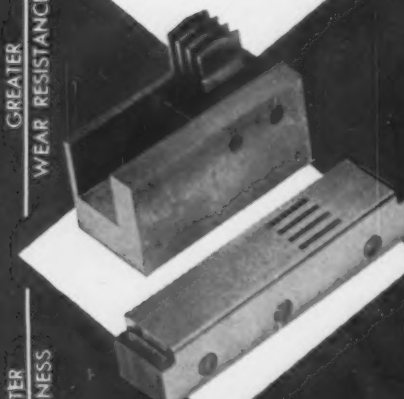
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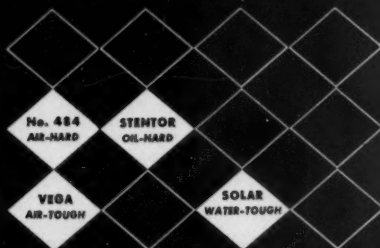
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of tools, dies and parts is yours with *Carpenter's* simplified **Matched Set Method of die steel selection**

when you want RESULTS . . .

on tools and dies for mass production of your products . . . count on a Carpenter Matched Tool and Die Steel. The manufacture of this patented screw anchor is a good example of working with the Matched Set Method to achieve improved results. Several Carpenter grades were selected for dies to mass-produce screw anchor parts in a highly competitive market. The dies shown to the left are only a few of many used on this job. The toolroom foreman says the Matched Set Method helps the company keep costs at rock bottom. Downtime has never been a problem, and production is maintained at a high level with little maintenance.

For a complete story on this job, ask your Carpenter representative to show you "Fact File No. 2000". This Report is one of hundreds based on actual plant records given to us by industry to prove conclusively the improved results obtained with Carpenter Matched Tool and Die Steels. When will you join the growing number of plants who are enjoying better, lower-cost results like these?



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pick up your phone and dial Carpenter's nearest Mill-Branch Warehouse, Office or Distributor. More and more companies are finding it pays to rely on Carpenter for fast delivery of a variety of specialty steels to meet day-to-day requirements. You can get immediate delivery of Matched Tool and Die Steels, Stainless Steels, and Special-Purpose Alloy grades from large local stocks. Call your nearest Carpenter Mill-Branch Warehouse, Office or Distributor, any time.



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Matched Tool and Die Steels

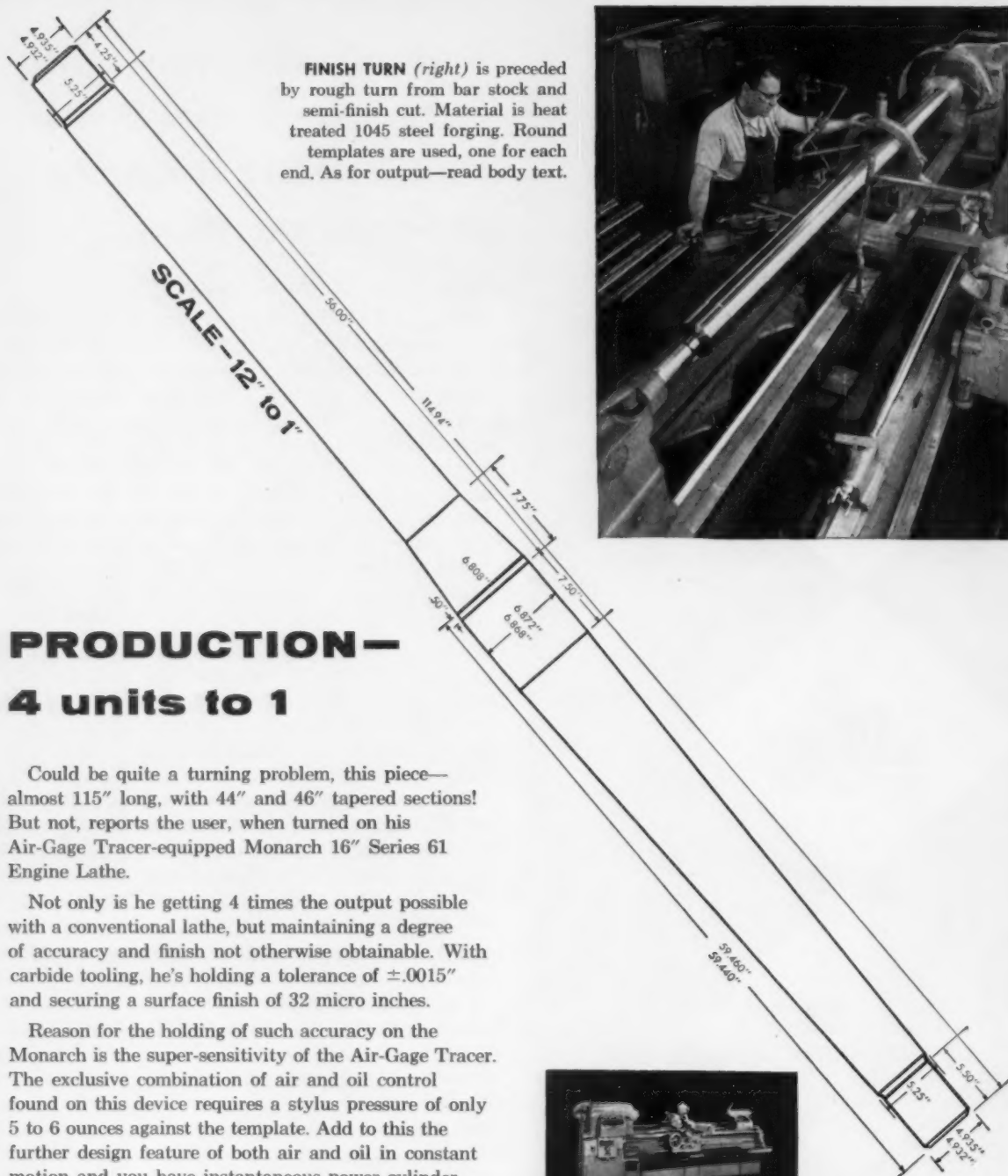
The Carpenter Steel Company, 121 W. Bern St., Reading, Pa.



Export Dept.: The Carpenter Steel Co.,
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FINISH TURN (right) is preceded by rough turn from bar stock and semi-finish cut. Material is heat treated 1045 steel forging. Round templates are used, one for each end. As for output—read body text.



PRODUCTION— 4 units to 1

Could be quite a turning problem, this piece—almost 115" long, with 44" and 46" tapered sections! But not, reports the user, when turned on his Air-Gage Tracer-equipped Monarch 16" Series 61 Engine Lathe.

Not only is he getting 4 times the output possible with a conventional lathe, but maintaining a degree of accuracy and finish not otherwise obtainable. With carbide tooling, he's holding a tolerance of $\pm .0015$ " and securing a surface finish of 32 micro inches.

Reason for the holding of such accuracy on the Monarch is the super-sensitivity of the Air-Gage Tracer. The exclusive combination of air and oil control found on this device requires a stylus pressure of only 5 to 6 ounces against the template. Add to this the further design feature of both air and oil in constant motion and you have instantaneous power cylinder response to the slightest change in template shape.

Now—about your turning requirements! We've got the machines and the tracer controls to better almost any conventional setup. Why not bet a three cent stamp against almost unlimited production improvement? Let us prove it . . . **The Monarch Machine Tool Company, Sidney, Ohio.**



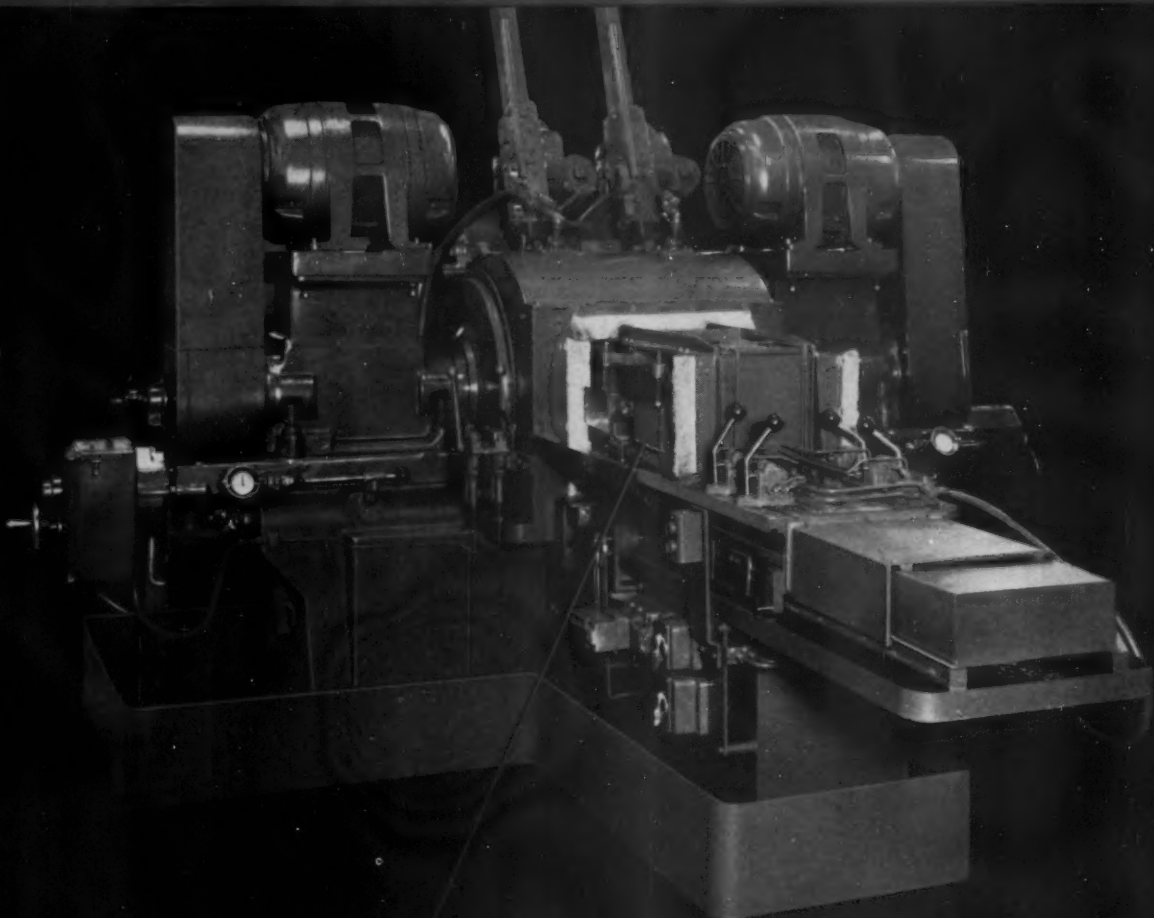
Monarch

TURNING MACHINES

FOR A GOOD TURN FASTER . . . TURN TO MONARCH

THE IRON AGE

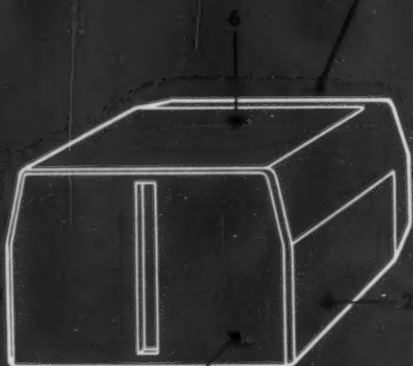
Disc Grinder tooled to sequence-grind non-parallel surfaces



Double disc grinding single surfaces of steel cement block cores, of several sizes, four at a time. A total of six surfaces are ground—four of which are not parallel. Tooling includes air-operated work clamping, hydraulically-operated work table.

Operating Data:

PRODUCTION: 120 surfaces per hr.
STOCK REMOVAL: $3/32''$ per side
FLATNESS: .002"
UNIFORMITY: .005"



GARDNER

precision disc grinders
BELOIT, WISCONSIN

240'

200'

150'

100'

0'

BAY STATE WHEELS for AMERICA'S

Texas Tower #3 shown during fabrication, courtesy of Continental Copper & Steel Industries, Inc., Walsh Holyoke, Portland Maine Division, builders. Sustaining hollow columns 240 feet high and 14 feet in diameter are of all-weld construction.

GRIND X-RAY QUALITY WELDS TEXAS TOWER # 3

Welding was a primary factor in this construction and Bay State Abrasive wheels were used for the mandatory grinding of X-Ray quality welded joints.



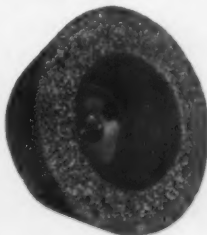
This 6,200-Ton island of steel, now solidly rooted to the ocean's floor, was built to meet the North Atlantic's full force. No wonder that Walsh Holyoke demanded clean, uncontaminated welding surfaces for each critical joint . . . and the grinding wheels which could do this most efficiently!

These were **BAY STATE** wheels, which can do the same for you. Get the details from your local **BAY STATE DISTRIBUTOR**.



BLUE FLASH

Specification A-24R-BF2 used for grinding straight welds, corners, angles, and deep joints.



FLARING CUPS

Specification 3A-16Q4-BA2 used for heavy snagging of wide welds, and surface preparation on broad areas.



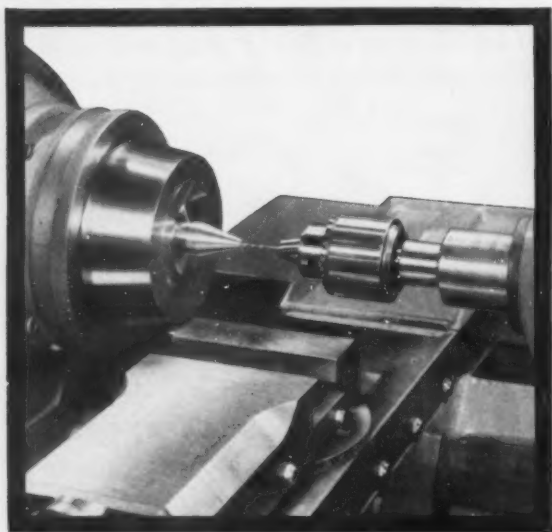
BAY STATE ABRASIVE PRODUCTS CO., Westboro, Massachusetts, U. S. A.

Branch Offices and Warehouses: Bristol, Conn., Chicago, Ill., Cleveland, Ohio, Detroit, Mich., Pittsburgh, Pa.

Distributors — All principal cities

In Canada: Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ont.

Rivett's 2 for 1 Lathe!



Sensitive...

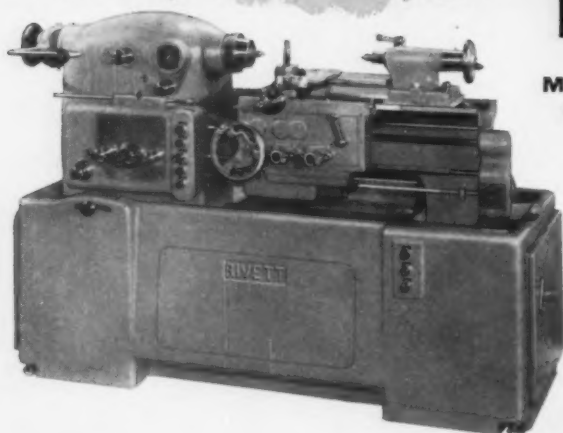
As An Instrument Lathe

Responds to the lightest touch
of the operator. Turns within
.0004" in 12" length!

POWERFUL...

As An Engine Lathe

Full horsepower transmitted to
spindle. Takes 1/4" chip with
.020" feed on cold rolled steel.



**Model 1020S "Steelway"
PRECISION TOOLROOM LATHE**

This lathe has the industry talking! Because of extreme precision, it has long been recognized as the top tool by master mechanics. Now, its adaptability and broad usefulness have highlighted its productivity. As one satisfied user states, "Our toolmakers go to a Rivett first in preference to our other lathes!"

RIVETT LATHE & GRINDER, INC.

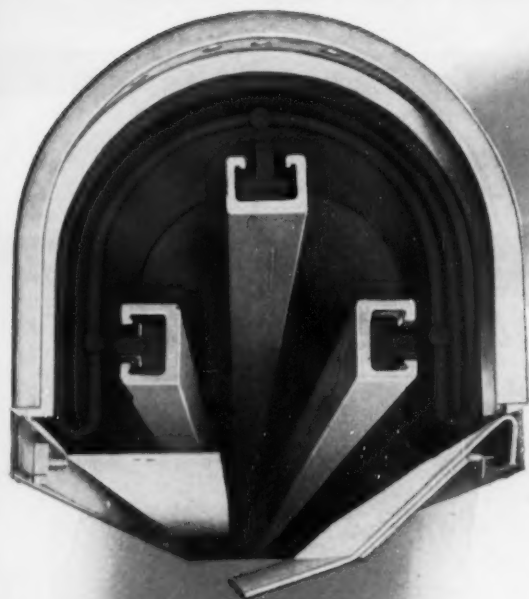
Dept. 1A-11, Brighton 35, Boston, Mass.



Go to Rivett now for information about this big, beautiful machine.
Send for bulletin 1020B.

RIVETT

"Steelway" Lathes



INCREASE SAFETY, SAVE INSTALLATION TIME AND COSTS with **LEC-TROL-FEED**

*KEYSTONE

Now, you can install safe power for cranes, hoists, welding units and other straight-runway equipment faster and cheaper than ever before. The new LEC-TROL-FEED System is rugged, long-lived and designed for the ultimate in worker safety. It is preassembled with lightweight aluminum bus bars arranged and insulated to provide extra leakage distances for troublesome applications. A rugged trolley assembly is built for long, trouble-free life—even under extreme conditions.

UNIQUE SAFETY SLOT COVER FOR MAXIMUM PROTECTION

No contact with current-carrying bus bars at top and sides is possible. Bottom safety cover provides maximum protection against accidents at trolley arm entry. Built-in positive safety permits you to locate this LEC-TROL-FEED System where it is most convenient for efficient production.

ALUMINIZED HOUSING 30' LONG SPEEDS INSTALLATION

Standard 30' long track sections mean fewer joints, rigidity of track requires fewer hangers. Expansion sections are needed only at building joints. Completely enclosed . . . requires no rain shields outdoors. Every part is easily accessible and trolley is removable at any joint section.

For fast-action installation . . . safety-first power . . . and long-life service install LEC-TROL-FEED. Write today for complete engineering data and technical file.

Send For This Technical Data



*Trademark



Electric Service Works

DELTA-STAR ELECTRIC DIVISION, H. K. PORTER COMPANY, INC.

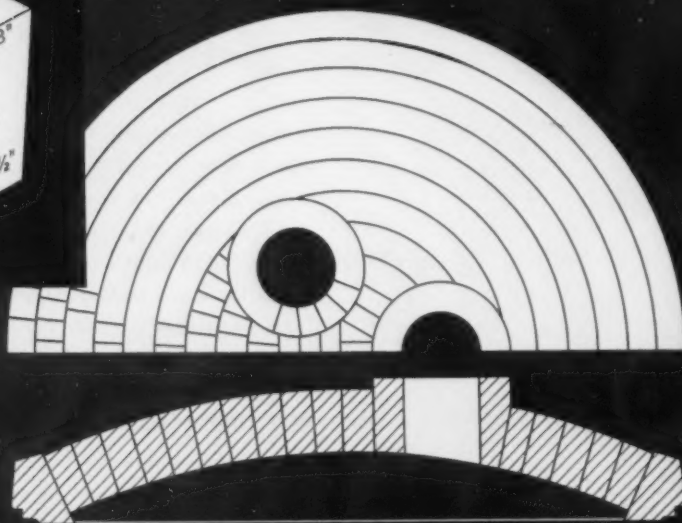
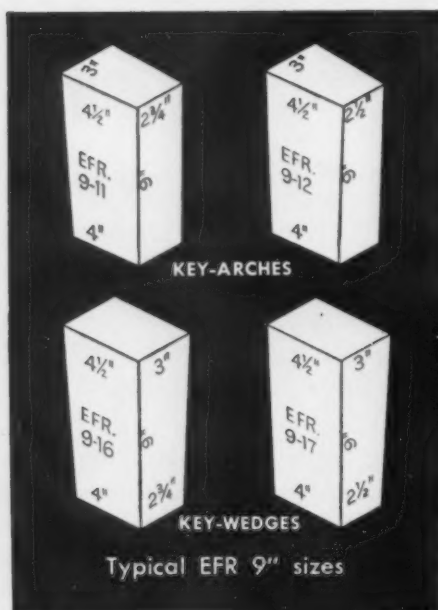
17th AND CAMBRIA STREETS, PHILADELPHIA 32, PA.



For electric furnace roofs

Harbison-Walker EFR design

provides important benefits



Harbison-Walker EFR (electric furnace roof) brick are modified 9" key-arches and key-wedges, designed for use in combination with a large proportion of standard 9 x 4 1/2 x 3" sizes in the construction of roofs of any diameter and rise.

The use of these EFR shapes insures a close fit of the brick and roof construction of best workmanship.

The number of different sizes required for building a roof with the aid of the EFR brick is greatly reduced for some designs.

Bricklaying is simplified and much time is saved when EFR brick are used.

EFR brick are power pressed by which method of forming all of the most desirable physical properties are secured.

Roofs built of smaller brick units in preference to large special shapes generally prove to be more serviceable. The smaller sizes are more resistant to thermal shock.

The EFR shapes cost less than large special shapes and since they are used with standard 9" sizes in predominance, the overall cost is considerably reduced.

H-W High Alumina Castable and Korundal Ramming Mix sometimes are used to advantage as a monolith to facilitate easy fitting in the center section.

The EFR brick, together with the standard 9" sizes needed for complete roofs, are furnished in the types and classes of refractories best suited for the various operating conditions. For example, they are made in the following brands: STAR and VEGA silica brick; H-W MULLITE; KORUNDAL; and various Harbison-Walker super-duty brands, such as ALAMO and H-W SUPER SAVAGE.

The combination of quality, H-W Technical Service and balanced selection based on availability of all types and classes of refractories from one source, provides maximum economy.

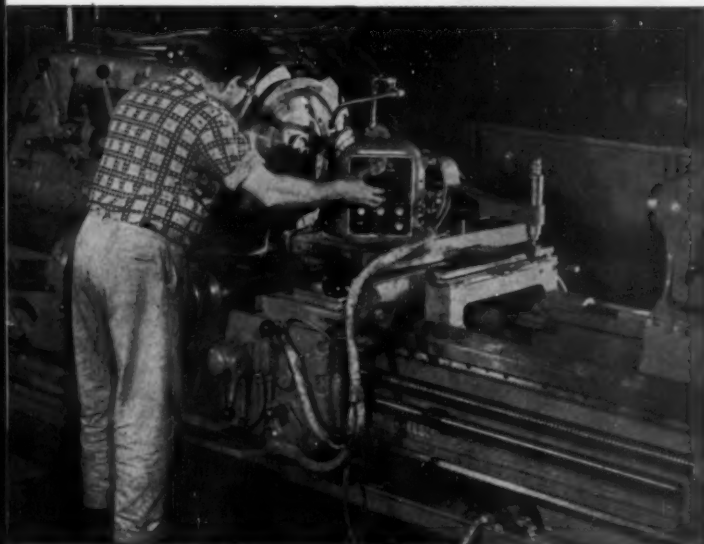


HARBISON-WALKER REFRACTORIES COMPANY
AND SUBSIDIARIES

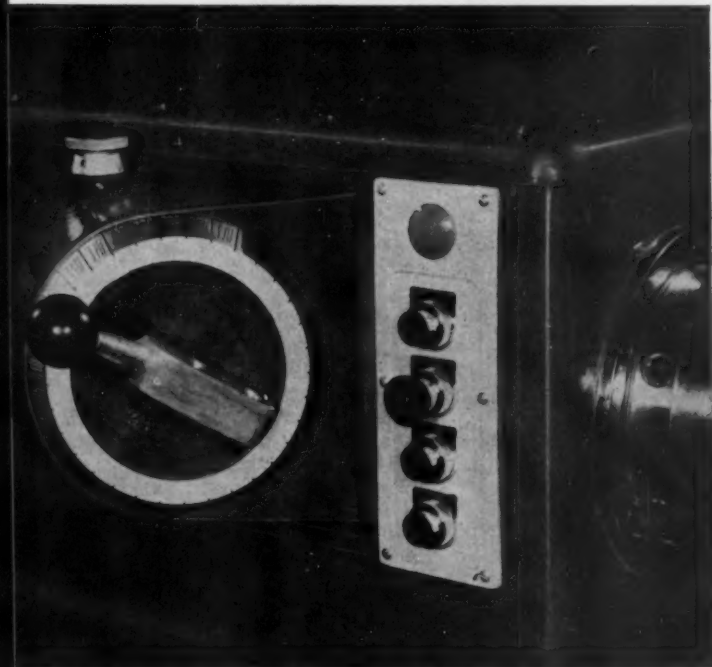
World's Most Complete Refractories Service

GENERAL OFFICES: PITTSBURGH 22, PENNSYLVANIA

AXELSON MANUFACTURING COMPANY / DIVISION OF U. S. INDUSTRIES, INC. / 6160 SOUTH BOYLE AVENUE, LOS ANGELES 58, CALIFORNIA



TURBO-JET ENGINE PRODUCTION. Contouring aft side of 125-pound turbine wheel on Axelson lathe equipped with electronic duplicator.



CENTRALIZED HYDRAULIC PRESELECTOR is one of the keys to easier operation and unusual flexibility of the Axelson 2516 heavy-duty lathe. With the preselector, the lathe can be used with equal ease for long-run production or single set-up operations.

ELECTRONIC TRACER CONTROL FEATURED IN JET TURBINE PRODUCTION

Rotating engine parts, which operate under widely fluctuating environmental conditions during high-speed aircraft flight, must be precisely machined so expansion and contraction of the metal will not affect engine performance.

At General Electric's AGT Division, Evendale, Ohio, Axelson lathes equipped with electronic duplicators reproduce turbo-jet engine parts. Using simple, flat templates, the electronic duplicators precisely control the lathes for highly-accurate contour-facing operations. Special carbide-tipped tools are used in the two-stage turning operations on the 28-32 Rockwell, Timken steel turbine rotor wheels. Floor-to-floor time for these two operations is less than an average work day.

NEW 2516 HEAVY-DUTY LATHE SIMPLIFIES OPERATOR CONTROL

Speed selection of 32 different spindle speeds from 11 to 1600 RPM has been greatly simplified in the new Axelson 2516 heavy-duty lathe through the use of a hydraulic pre-selector.

The operator can preset a new spindle speed while the lathe is in operation, move to the end of the bed and, without returning to the headstock, automatically switch to the pre-selected speed by operating a lever on the apron.

Speed changes are made through involute clutches; the headstock contains no sliding gears.

For a complete description and detailed specifications on the 2516, the new Axelson 4025 and Axelson Tool Room, Medium-Duty and other Heavy-Duty Lathes, write for bulletins I11-5507 and 5504.



AXELSON MANUFACTURING COMPANY
Division of U. S. Industries, Inc.
6160 SOUTH BOYLE AVENUE
LOS ANGELES 58, CALIFORNIA

GF Gets "Dead Flatness" from Pittsburgh Sheet



Production of the Draft-a-Matic, one of GF's newest products, starts the same way as the dozens of other desk-type pieces of office equipment GF makes. Here a stretcher-leveled sheet of Pittsburgh Steel is being trimmed to exact size, the first of many trips it will make through a forming press.

Top Office Furniture Maker Demands Flaw-Free Steel

Forty-one cents from every sales dollar of The General Fireproofing Company—one of the oldest and largest manufacturers of metal office furniture—goes for purchase of materials. And steel makes up a major portion of this expense.

That means sheet steel like that supplied by Pittsburgh Steel Company is the most important single material GF uses. With such a heavy portion of its purchasing involved, GF can't afford to buy less than the best steel available.

In less than 50 years in the metal furniture business, GF has pioneered several steel office equipment products. It produced the first stock steel desk and is now the world's largest manufacturer in this line. It offered the first stock steel filing cabinet, was the first firm to successfully laminate a plastic top directly to steel.

In its big Youngstown, Ohio, plant GF can turn out more than 100 different models of chairs. As one of the top producers in the office equipment field, GF owes its position to the stress it gives three points:

- The highest quality of materials.
- Intensive product development and research.
- Vigorous salesmanship backed up by a production skill arising from craftsmanship and ingenuity.

Ever since it began producing sheet steel, Pittsburgh Steel Company has been supplying an important part of GF's cold-rolled sheet requirements. GF buys Pittsburgh's commercial quality sheets in regular finish ranging from .030 to .093 inch in thickness and from 2 $\frac{1}{16}$ to 52 inches in width.

Because of its long experience in metal furniture fabrication and the volume of its business now—in excess of 50 million dollars a year—GF has developed rigid, exacting standards for the steel it uses. GF flatness and surface finish standards are very rigid.

The two most critical standards Pittsburgh Steel meets are GF requirements for flatness and good surface finish.

To insure required "dead" flatness in the sheets it uses, GF goes a step

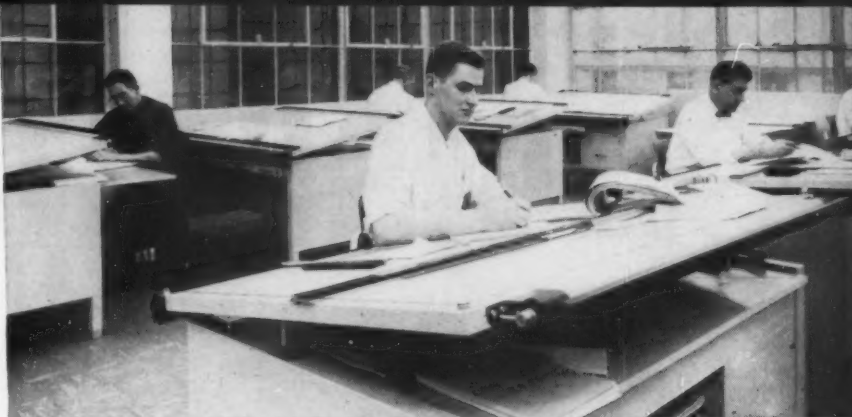
further than most of its competitors by both rolling and stretcher-leveling sheets before they are fabricated into the tops, sides, backs, drawers and doors of office furniture.

Steel sheet is run cold through a roller and is then elongated or stretched on a hydraulic stretcher, sometimes as much as one to three inches. Reduction in thickness is minor.

• **High Standards.** Ingrained dirt, pits, scratches, slivers, cross-breaks, deep rust or other defects—which might have appeared insignificant before stretching—often show up in the elongated sheet should inherent quality not be the best.

These defects, along with water stains, edge corrugation or even the slightest waviness, make the steel unacceptable to GF. When painted, pits and waves in the steel are highlighted. If the sheet is to be laminated with a synthetic covering, as in desk tops, it must present the flattest and smoothest surface possible to produce a good bond.

Some sheet steel can't take stretcher leveling and there have been instances, according to GF Director of Purchases Roy Mills, where GF had to eliminate the supplier entirely.



GF calls the finished Draft-a-Matic the most important advance in drafting room equipment in the past 50 years. Drafting space, calculating, storage and reference areas are incorporated in the same desk.

"That has never applied to Pittsburgh Steel's sheets," adds Mr. Mills. "We're entirely satisfied with Pittsburgh Steel from all standpoints of quality."

If Pittsburgh Steel's sheets can meet standards as high as General Fireproofing's, Pittsburgh Steel is a likely solution to your needs for a steel that has:

- *Top Notch Internal Quality* arising from its accurate chemical analysis and proper grain structure.

- *Superior Surface* which is clean, bright and reflective.
- *Flatness and Dimensional Uniformity.*
- *Shapeliness* imparted by inherent strength and formability.

There is an experienced Pittsburgh Steel sales engineer as close as your telephone. He's anxious to apply Pittsburgh Steel's 50 years of know-how and its completely modern sheet production facilities to solve your sheet problems.



A Draft-a-Matic channel results from this operation. Cut-length cold-rolled sheets from Pittsburgh Steel are free from surface scale, thus preventing die damage or imperfect cuts.



After the pedestal has been formed on a tangent bender, the Draft-a-Matic pedestal goes into this automatic welder. Twenty-four welds are made simultaneously.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

- | | | | | |
|----------------|--------------|-------------|----------------|------------|
| • Atlanta | • Chicago | • Cleveland | • Columbus | • Dallas |
| • Dayton | • Detroit | • Houston | • Los Angeles | • New York |
| • Philadelphia | • Pittsburgh | • Tulsa | • Warren, Ohio | |

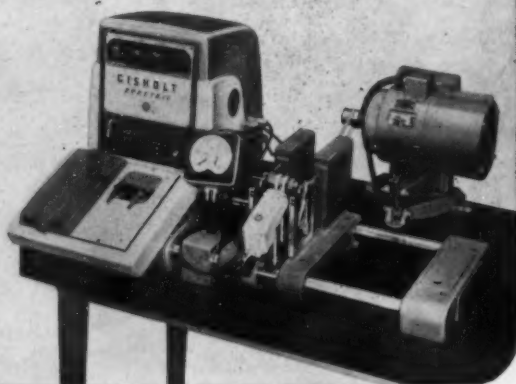


GISHOLT takes the ...cuts time

**Gisholt
1SVI Balancer.** For
parts up to 11 1/2" diam.
weighing 1 to 15 lbs., or
up to 17 1/2" diam. weigh-
ing 2 to 50 lbs. Locates
and measures static
(force) unbalance in disc-
like parts.

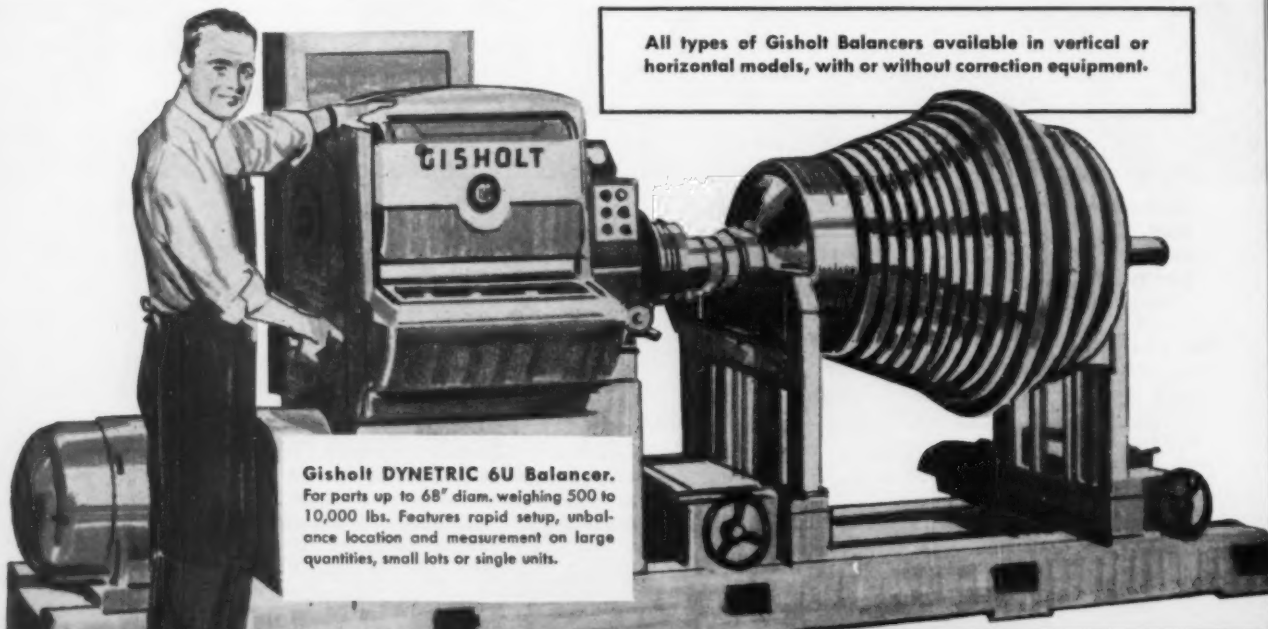


Gisholt OSB Bench Balancer. For parts up to 6" diam.
weighing 0.25 to 5 lbs. Small parts readily handled, with location
and amount of unbalance in each of two selected planes accu-
rately determined in 15 seconds or less.



All types of Gisholt Balancers available in vertical or
horizontal models, with or without correction equipment.

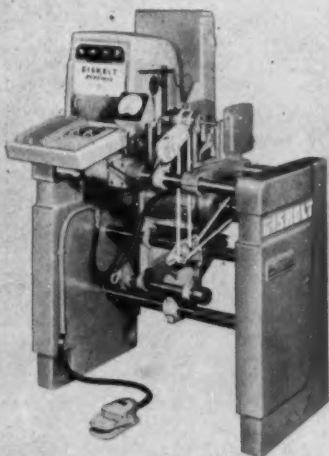
Gisholt DYNETRIC 6U Balancer.
For parts up to 68" diam. weighing 500 to
10,000 lbs. Features rapid setup, unbal-
ance location and measurement on large
quantities, small lots or single units.



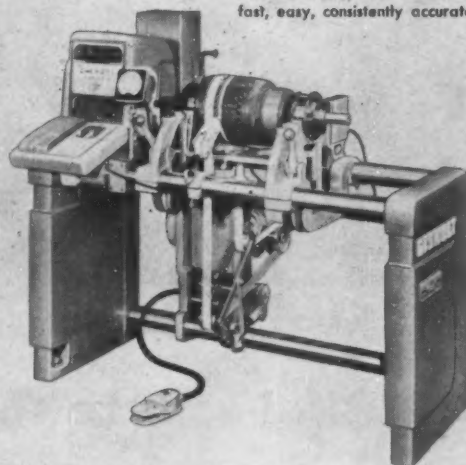
guesswork out of balancing and costs, too!



Gisholt 15 Balancer. For parts up to 12" diam. weighing 1 to 30 lbs. Locates and measures either force or moment unbalance effects, indicating amount of correction in units most practical for part.



Gisholt 35 Balancer. For parts up to 24" diam. weighing 15 to 300 lbs. Gisholt Balancers eliminate charts and graphs, make balancing fast, easy, consistently accurate.



IN A MATTER OF SECONDS, a Gisholt Balancer locates and measures vibratory movements in either one or two planes (force or moment), and tells your operator precisely where and how much correction to make to balance the part.

By simply reading the Amount Meter, he knows instantly how much solder or how many washers to add, or how deep to drill, etc. There is no computation, no charts or graphs because Gisholt Balancers tell the story directly—and they tell it in terms of the actual correction method employed.

How is it done? Through electrical networks, provid-

ing the necessary amplification for precise readings... and eliminating guesswork by separating and isolating unbalance effects, for maximum accuracy and ease of correction on all types of work.

What will Gisholt Balancing mean in your own operations? Just this: you'll balance more parts per hour—to highest possible standards at lowest possible costs.

Whether you plan to balance parts weighing only a few ounces to 150 tons...your Gisholt Representative can show you the better way of doing it with Gisholt Balancers. Call him today!



GISHOLT

MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

WRITE TODAY for 36-page illustrated booklet "Balancing Machines," analyzing problems of balancing rotating parts.





Beautiful bronze fountain for Pittsburgh's new Mellon Park... thanks to *GAS*

Precise heat control on Gas-fired melting furnaces helped cast nine huge bronze bowls for the unusual fountain display in Mellon Park, Pittsburgh, Pennsylvania.

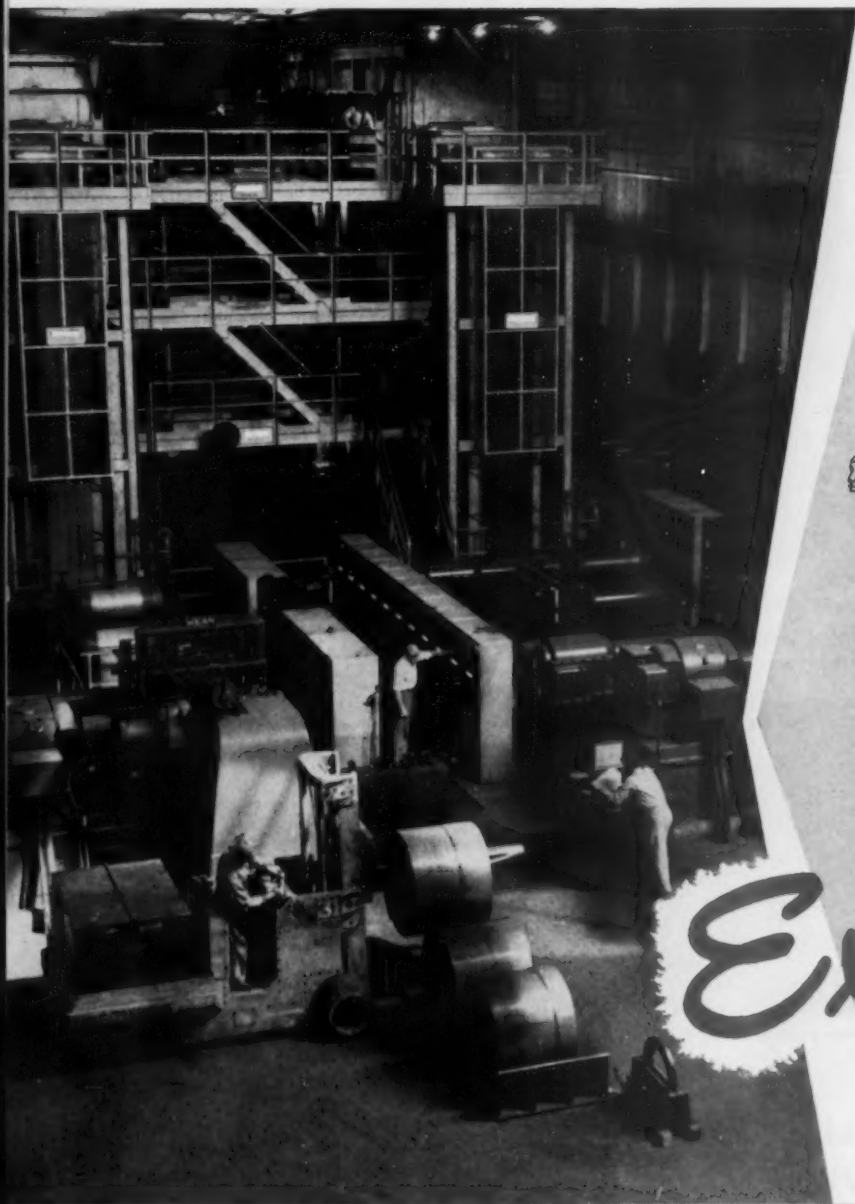
To make the castings, Jas. H. Matthews & Company of Pittsburgh melted bronze ingots in large Gas-fired furnaces. Accurate furnace temperature control provided by Gas burners held the molten metal at 2300 degrees F. until the metal was ready to be poured into specially prepared sand molds.

Accurate, controllable Gas is an excellent production tool throughout all industry. For information on how Gas can help you in your production operations, call your Gas Company's industrial specialist. He'll be glad to discuss with you the economies and outstanding results you get with Gas and modern Gas-fired industrial equipment. *American Gas Association.*





WEAN CONTINUOUS STRIP ANNEALING LINES



WHEN
Experience
COUNTS

Two of five Wean Continuous Strip Annealing Lines installed in a Pittsburgh district mill.

Ninth Wean Engineered Line Sets New Record

The ninth Wean designed continuous strip annealing line for silicon and tinplate products is now in the process of construction. This means that Wean has engineered more of these lines than all other firms combined — a record in every sense of the word.

The reasons for this Wean leadership are many.

For example, the Wean design permits maximum speed and production while providing an excellent bright annealed product of uniform surface. And, users of Wean continuous lines report better metallurgical control, better temper mill operation with elimination of stickers, better delivery and a reduction in process inventory.

★ Wean also has designed and built 11 Stainless Steel Continuous Annealing Lines — also a record in the industry.

THE



WEAN

ENGINEERING COMPANY, INC. WARREN, OHIO

1906-1956

The
FERRY CAP
& Set Screw
Company

50th

EXPERIENCE COUNTS! . . . and Ferry Cap has the experience
. . . a full Half Century of accumulated know-how.

PRODUCTS COUNT! . . . and only Ferry Cap can supply you
with three lines of hexagon head cap screws:

LO-CARBS for regular use
HI-CARBS for strength
SHINYHEADS for looks

PLUS: Set Screws—square head and headless, Fillister Cap Screws, Flat
Head Cap Screws, Shinyland Studs, and Hexagon Nuts.

STANDARDS
by the
MILLIONS



New, highly efficient Order Department processes your order immediately.

SERVICE COUNTS!

**New Order Department . . .
geared to FASTER SERVICE!**

A streamlined, new system operated by experienced personnel speeds your order through to our shipping department the very day it arrives! Both mail and phone orders are received and recorded at these busy desks . . . and are sped away to the shipping department. By the running inventory maintained here, Ferry Cap management is constantly aware of all inventory situations, and the factory is automatically alerted to start producing any item before shortages can develop. That's why standards are "in stock" when you order. Ferry Cap is geared to FAST SERVICE!



Anniversary

YESTERDAY—Our first shipment was a 25-pound keg delivered locally by horse and wagon.



TODAY—Ferry Cap products are used nationwide and reach our customers swiftly by truck, train, and plane.

**SPECIALS
by the
MILLIONS**

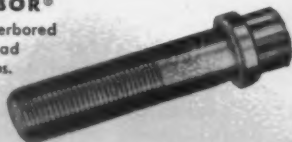
Not only does Ferry Cap make standard fasteners, but we are "specialists at special fasteners" . . . and we can supply them to your blue prints on short notice.

Odd shapes pose no problem, for we have long experience in providing the unusual. And your special can be furnished in many types of carbon, alloy, or stainless steel—and in non-ferrous materials as well.

With many types of production equipment for secondary machining, drilling, milling, grinding, and heat treating, we are equipped to give you special features and any plated finish. You'll find that Ferry Cap's thorough inspection system insures conformity to your specifications.

COUNTR-BOR®

A new screw for counterbored or other socket head screw applications.



The FERRY CAP & Set Screw Company

Pioneers and Specialists, Cold Upset
Screw Products Since 1906

2157 Scranton Rd., Cleveland 13, O.

6

good questions about aluminum JOINING

...and

6

good answers

by Kaiser Aluminum Distributors

If you have a problem in joining aluminum, the chances are your *Kaiser Aluminum Distributor* can help you solve it. He has metal know-how and experience with many fabricating operations. Use his fund of technical knowledge, backed by the engineering ability of Kaiser Aluminum's field staff.

Here are answers Kaiser Aluminum Distributors have given on specific joining questions asked by aluminum fabricators in various parts of the country. Questions such as these may also be bothering you.

Q. We've had difficulty in attaining good, tight joints in driving aluminum rivets. What is our trouble?

A. The most common cause of a poor joint in riveting aluminum is that the rivet is over-driven. Drive the rivet until it is tight, but do not over-drive. The proper procedure can be established by making control samples.

Q. We've been spot welding on curved aluminum surfaces. But we can't get a good weld with alloy 6061. Why?

A. The difficulty is in the welding tip . . . it's not making good contact on the curved surface. Change the tips to ones with conforming surfaces and you'll get a more perfect weld.

Q. We want to weld heavy sections of aluminum. What is the fastest welding method?

A. Where a large number of joints are to be made and the capital outlay is justified, the consumable electrode inert gas shielded arc method is the fastest. It is usually used on metal thicknesses greater than 1/4 inch. Arc welding usually requires less joint preparation, less carefully controlled welding technique and less skilled operators. Distortion of the welded parts is small because of the concentrated heat of the arc. And, post weld cleaning is not required.

Q. Too many of our welds have been unsound. Our welders are experts and have used proper welding techniques. What's the answer?

A. In your case the trouble is improper surface preparation. Make sure all aluminum is cleaned with mildly alkaline solutions or commercial degreasers before welding. Use a wire brush to remove heavy oxide. Make sure the aluminum is clean *before* you start to weld and your welders will do a good job.

Q. Soldering aluminum has really been a problem in our sheet metal shop. We can't get the solder to adhere to the aluminum. Is there a way to do this?

A. There certainly is, but first it is essential to remove the oxide coating from the aluminum sheet. Solder can't wet or adhere to an oxide coated surface. Scrape or clean the surface, then apply a specially prepared aluminum flux and solder. The melting point of aluminum solders are above those used for other metals and require use of a flame instead of a soldering iron.

Q. Small welds of aluminum have been unsatisfactory. We've noted tungsten inclusions and gas porosity in our welds. What's the trouble?

A. Your welders have been pencil-pointing heli-arc tungsten electrodes. This causes a greater density and a low starting current, thereby necessitating a longer dwell time at the beginning. Better have your welders use standard diameter electrodes and a higher starting current.

* * *

For the right answer, ask your Kaiser Aluminum Distributor

Kaiser Aluminum Distributors have helped hundreds of fabricators find the answers to difficult problems. Whether it's selecting the right material for a particular job, suggesting more economical methods of operation, or solving complicated production problems, your Kaiser Aluminum Distributor is ready to give you instant assistance.

Naturally, you can always depend on him for prompt service in supplying you with aluminum cut to your specifications *as you need it*. Take advantage of the personalized service and technical know-how offered by your Kaiser Aluminum Distributor. Call him today!

Kaiser Aluminum

"THE KAISER ALUMINUM HOUR." Alternate Tuesdays, NBC Network. Consult your local TV listing.

Kaiser Aluminum Distributors

GIVE YOU PROMPT SERVICE

ATLANTA, GEORGIA

Warehouse Division, Atlantic Steel Co. Phone: Emerson 3451

BALTIMORE, MARYLAND

Hill-Chase Steel Co. of Maryland Phone: Peabody 2-7300

BEAUMONT, TEXAS

Standard Brass & Mfg. Co. Phone: 4-2641

BOSTON METROPOLITAN AREA

Hawkrige Bros. Co. Phone: Hubbard 2-8600

Zurbach Aluminum Co. Phone: Monument 6-1400

BRIDGEPORT, CONNECTICUT

A. R. Purdy Co., Inc. Phone: Edison 6-3531

CHICAGO METROPOLITAN AREA

Fullerton Steel & Wire Co. Phone: Merrimac 7-2700

Korhmel Steel & Aluminum Co. Phone: Ambassador 2-6700

Evanston, Illinois

Miratile Mfg. Company Phone: Hudson 8-4000

(Serves House Trailer Industry only)

U.S. Steel Supply Div.—United States Steel Corp. Phone: Brunswick 8-2000

CINCINNATI, OHIO

Morrison-Drabner Steel Co. Phone: Wabash 1-4480

CLEVELAND, OHIO

Copper & Brass Sales, Inc. Phone: Endicott 1-6757

Osco Steel Co. Phone: Broadway 1-2425

DALLAS, TEXAS

Delta Metals, Inc. Phone: Lakeside 6-7443

Earle M. Jorgensen Co. Phone: Riverside 1761

DAVENPORT, IOWA

Nichols Wire & Aluminum Co. Phone: 3-1895

DENVER, COLORADO

ABC Metals Corp. Phone: Amherst 6-2644

DETROIT, MICHIGAN

Alloy Steels, Inc. Phone: Texas 4-3890

Copper & Brass Sales, Inc. Phone: Lorain 7-3380

ELKHART, INDIANA

Miratile Mfg. Company Phone: 2-9940

(Serves House Trailer Industry only)

GRAND RAPIDS, MICHIGAN

Copper & Brass Sales, Inc. Phone: Empire 1-6681

HONOLULU, T. H.

Permanente Cement Co. Phone: 5-2541

Honolulu Iron Works Phone: 5-0961

HOUSTON, TEXAS

Earle M. Jorgensen Co. Phone: Orchard 1621

Standard Brass & Mfg. Co. Phone: Capitol 5-6531

INDIANAPOLIS, INDIANA

Hubbell Metals, Inc. Phone: Walnut 5-9261

F. H. Longsenkamp Company Phone: Melrose 6-4321

KANSAS CITY, MISSOURI

Hubbell Metals, Inc. Phone: Baltimore 1-7760

LOS ANGELES, CALIFORNIA

Eureka Metals Supply Co. Phone: Mutual 7286

Earle M. Jorgensen Co. Phone: Lorain 7-1122

Reliance Steel & Aluminum Company Phone: Adams 3-1193

MEMPHIS, TENNESSEE

Hubbell Metals, Inc. Phone: Jackson 5-2676

MIAMI, FLORIDA

Fullerton Metals Co. Phone: Plaza 7-2531

MILWAUKEE, WISCONSIN

Fullerton Metals of Wisconsin, Inc. Phone: Greenfield 6-1100

Korhmel Steel & Aluminum Corp. of Wis. Phone: Evergreen 4-6000

MINNEAPOLIS, MINNESOTA

Korhmel Steel & Aluminum Co. Phone: Geneva 2661

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Orleans Steel Products Co., Inc. Phone: Raymond 2116

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T. E. Conklin Brass & Copper Co., Inc. Phone: Walker 5-7500

A. R. Purdy Company, Inc., Lyndhurst, N. J.

Lyndhurst: Phone Webster 9-8100 New York: Phone Chelsea 3-4455

Newark: Phone Humboldt 2-5566

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American Brass & Copper Co. Phone: Higate 4-2366

Gilmore Steel & Supply Co. Phone: Glencairn 1-1680

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Hill-Chase & Company, Inc. Phone: Delaware 6-5400

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William M. Orr Co., Inc. Phone: Churchill 2-3000

PORT ARTHUR, TEXAS

Standard Brass & Mfg. Co. Phone: 5-9377

PORTLAND, OREGON

Eagle Metals, Inc. of Oregon Phone: Tuxedo 5201

SAN FRANCISCO, CALIFORNIA

Gilmore Steel & Supply Co. Phone: Klondike 2-0511

Earle M. Jorgensen Co. Phone: Mission 7-7800

SEATTLE, WASHINGTON

Eagle Metals Company Phone: Lander 9974

SHREVEPORT, LOUISIANA

Standard Brass & Mfg. Co. Phone: 2-9483

SPOKANE, WASHINGTON

Eagle Metals Company Phone: Keystone 4-0586

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Hubbell Metals, Inc. Phone: Franklin 1-0212

U.S. Steel Supply Div.—United States Steel Corp. Phone: Jefferson 5-0440

ST. PAUL, MINNESOTA

U.S. Steel Supply Div.—United States Steel Corp. Phone: Midway 6-7311

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A. R. Purdy Co., Inc. Phone: Syracuse 72-6677

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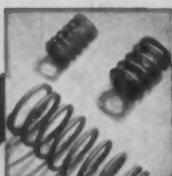


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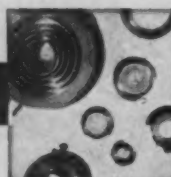
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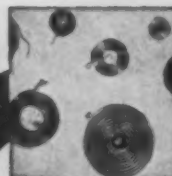
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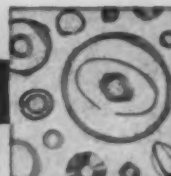
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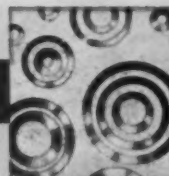
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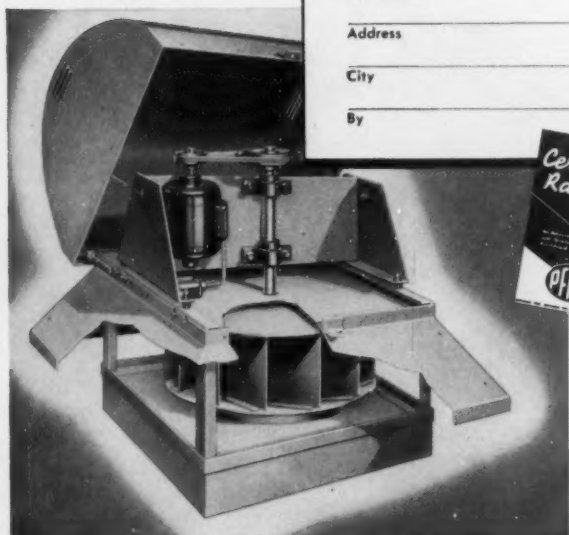
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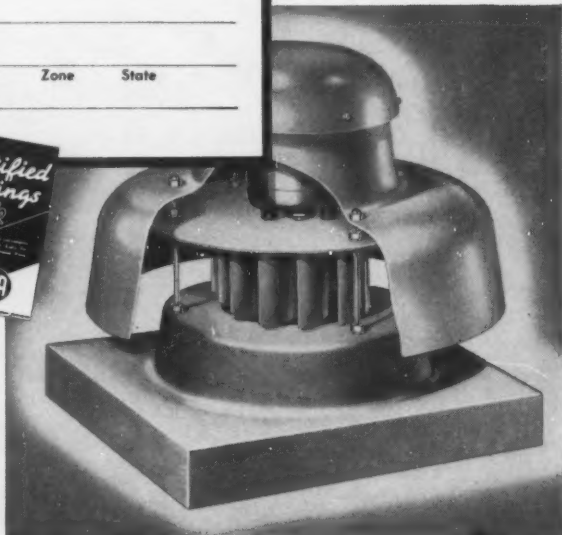
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BURT V-BELT DRIVE CENTRIFLOW

Fit standard roof curb outlets. Power drive in separate enclosure supported on resilient rubber vibration eliminators • Hinged top for easy maintenance • 3 basic damper types • Motors in all power characteristics from 1/6 to 7-1/2 H.P. • Oversize V-belt and sheaves • 13 basic sizes • Capacities from 675 c.f.m. to 36,430 c.f.m.



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Shipped complete ready to install on roof curb. Low profile spun aluminum with stainless steel supports • Motor in separate compartment on rubber vibration pads for quiet operation • Easy servicing accessibility • 4 basic damper types • From 1/12 to 1/2 H.P. • 2 basic sizes • Capacities from 408 c.f.m. to 2508 c.f.m.

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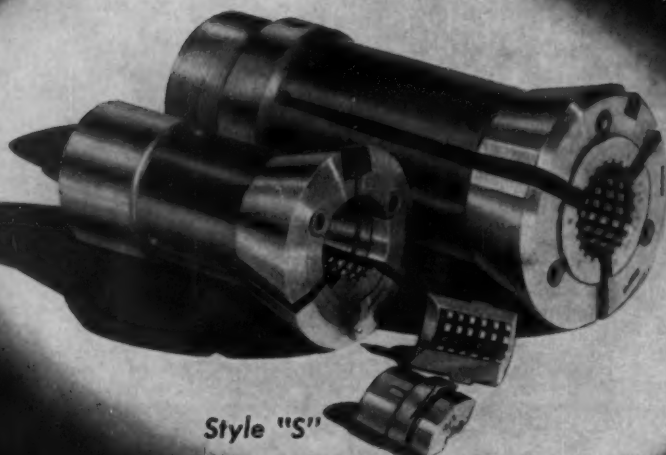
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AMERICAN BRIDGE

erects 17,524 tons of steelwork in just 4 months
for FORD'S NEW METAL STAMPING PLANT

DESIGNS BY: FORD MOTOR COMPANY AND
SMITH, HINCHMAN & GRYLLS, INC., ASSOCI-
ATE ARCHITECT AND ENGINEERS, DETROIT.

Factory Building, including Office
and Employees' Facilities—
1,123' x 1,360'

11,615 tons

Pipe Trestle from Factory Bldg.
to Powerhouse

11 tons

Press Girders

2,400 tons

Press Floor

3,305 tons

Oil House—40' x 62'

10 tons

Pump House—30' x 82'

46 tons

Car Puller Building—16' x 24' ..

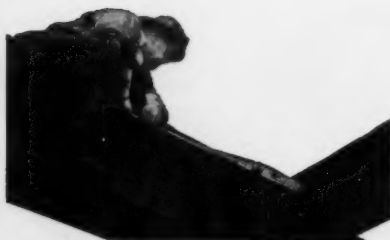
2 tons

Bridge

135 tons

17,524 tons*

*American Bridge also fabricated 14,404
tons of this amount, sub-letting 3,120 tons.



BOLTED—All field connections on this job were
made with high tensile and ordinary bolts.

The Ford Motor Company will begin operation of its fourth metal stamping plant late this summer.

Located near Chicago Heights, about 25 miles from the Loop, the new plant is as modern as you'll find anywhere. The mammoth steel frame main building is 1123' wide by 1360' wide and provides 1,700,000 square feet of floor space, for offices, employee facilities, and the factory.

The plant is designed to accommodate 22 major and 21 intermediate lines of giant 50- to 1,000-ton presses. When full production is reached, the plant will employ approximately 4,000 people and turn

out upwards of 160 freight-car loads of automobile body stampings per day.

17,524 tons of structural steel went into the vast building. American Bridge fabricated 14,404 tons and erected the entire 17,524 tons. In the panel above is listed the tonnage used in the project. All field connections were made with high tensile and ordinary bolts.

If you would like to know more about the advantages of having American Bridge fabricate and erect the structural steel work for your expanding industrial facilities, just contact our nearest office.

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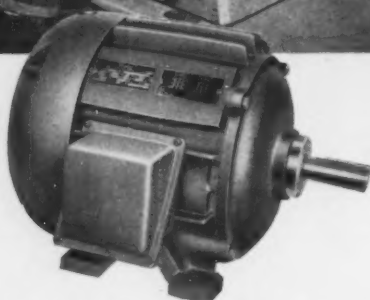
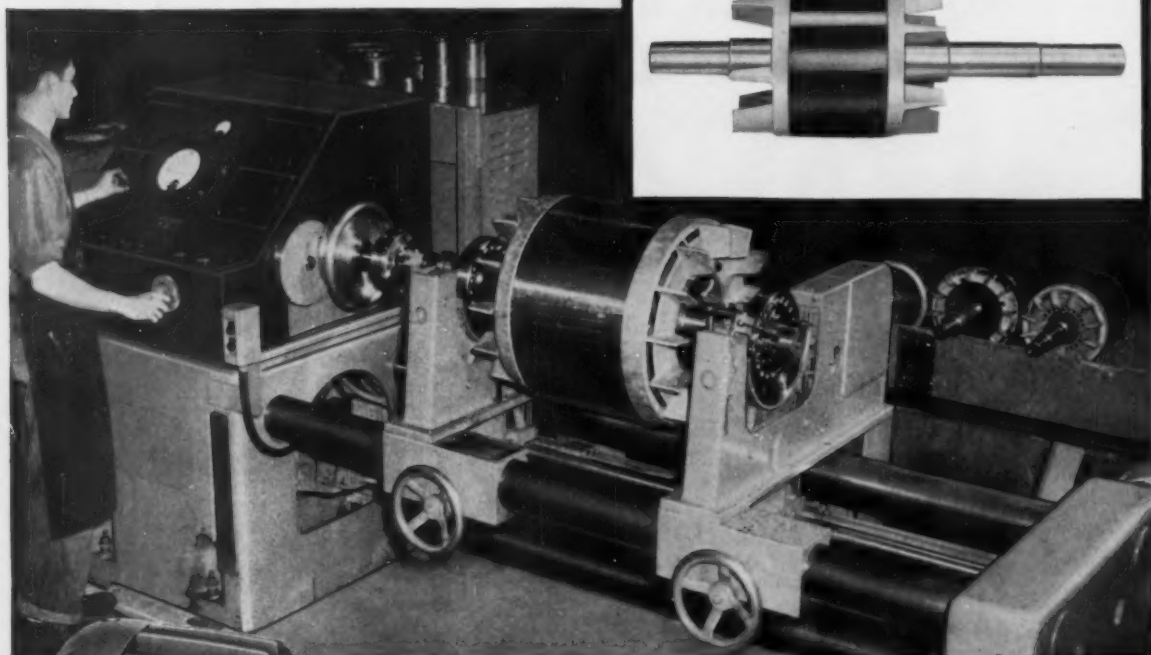
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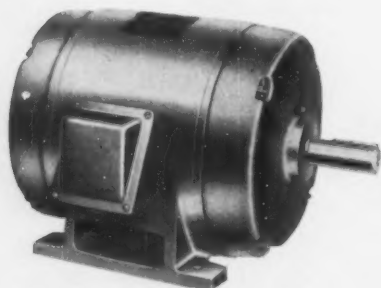


UNITED STATES STEEL

WAGNER ELECTRIC MOTORS...
THE CHOICE OF LEADERS IN INDUSTRY



Wagner totally-enclosed fan-cooled motor.
1 through 30 hp, NEMA Frames 182-326U.



Wagner open type drip-proof motor.
1 through 30 hp, NEMA Frames 182-326U.

All Wagner Motors are *DYNAMICALLY BALANCED* for smooth performance

Motor balance is important to fine machine tool performance. A well-balanced motor greatly reduces vibration—allows your machine tools to turn out the accurate work for which they are designed.

Every rotor, even in the smallest fractional hp rating, used in a Wagner Motor is dynamically balanced on balancing machines like that shown above.

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M56-9



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So rugged we dare offer a year's
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In a grueling torture test, the *Power-Built* Black & Decker Heavy-Duty Impact Wrench ran for 500 hours of continuous operation without a breakdown—and was still going strong. Our special *free* service certificate is extra proof of its ruggedness. Yet this tool is so speedy, it hits maximum torque when other impact wrenches are just warming up.

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Look in the Yellow Pages under "Tools — Electric" for Nearest Distributor.



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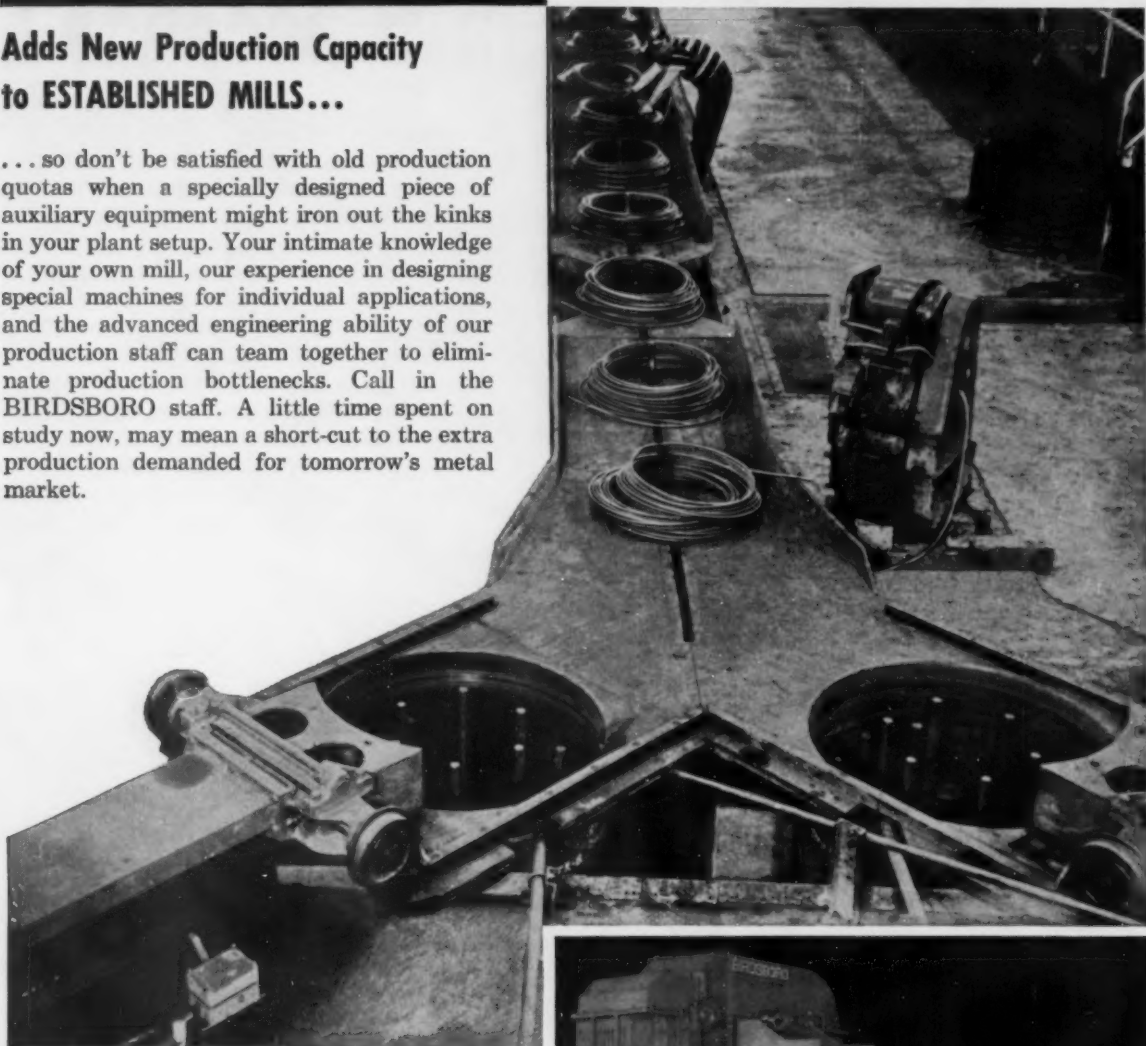
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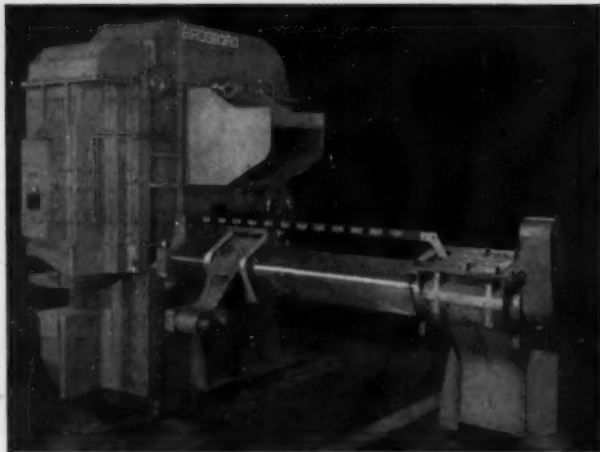
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Weldments "CAST-WELD" Design

ROLLS: Steel, Alloy Iron, Alloy Steel

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Combination Mill
Rod Coilers and Rod
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This 350-ton Birds-
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is used for hot shear-
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MM-54-56

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Carrier reports: "The period between degreaser cleanouts has been extended from four to ten weeks." Further, there is "less 'coking' on coils and the necessity of constant checks of solvent pH is substantially reduced."

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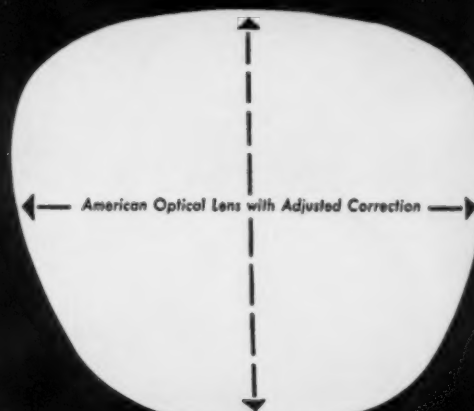
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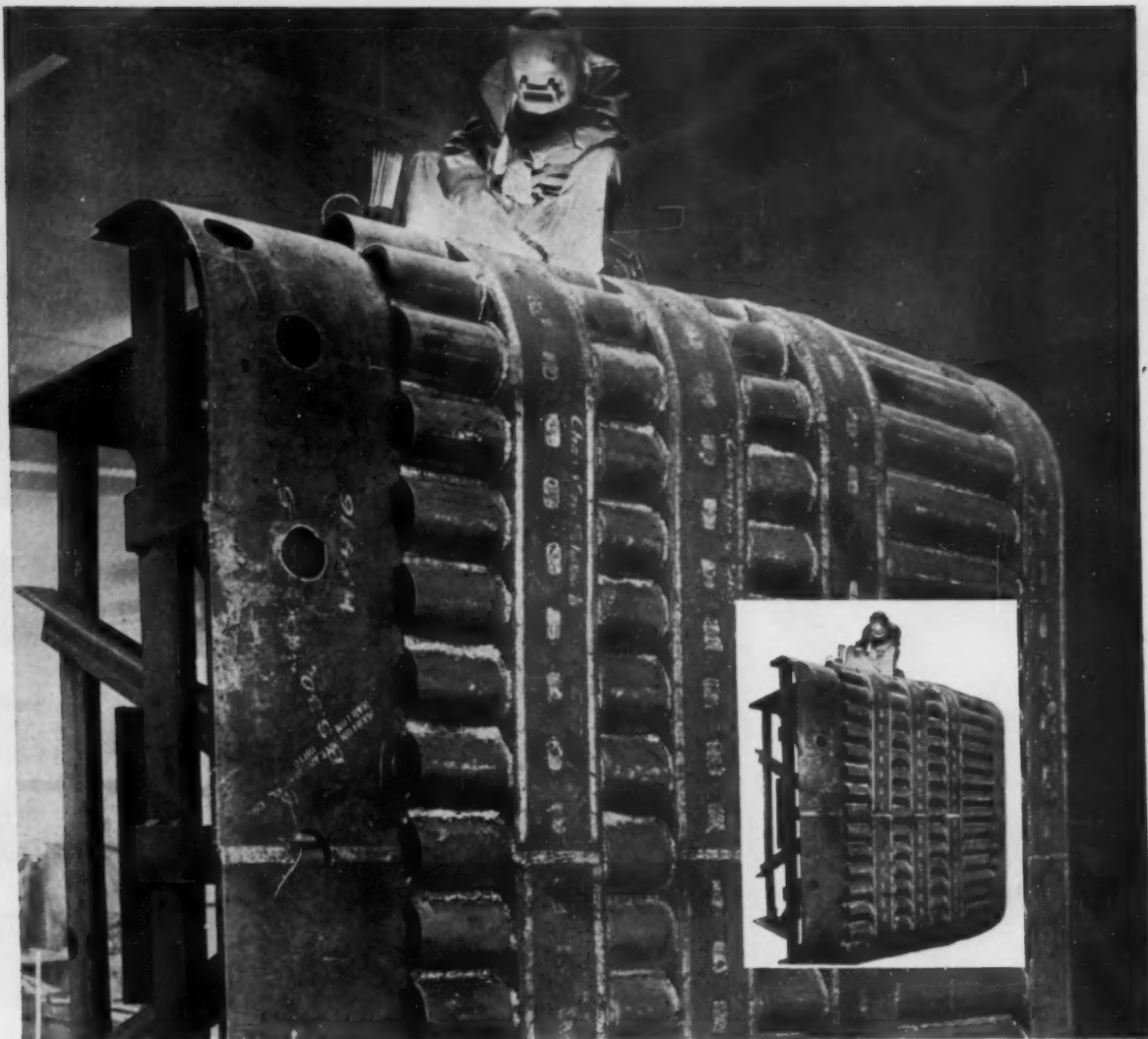
Electronic computing gives a new scientific dimension to lens perfection. This advance for the first time is adapted to safety lenses and is now available with American Optical eye protection equipment.

Write for descriptive literature just off the press!

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Always insist on
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Another huge dipper for a Marion type 5561 stripping shovel—made entirely of Lukens "T-1" steel for extra strength, impact and

abrasion resistance—in the shops of Marion Power Shovel Company, Marion, Ohio.

Fabricator of power shovels says:

"LIKE THE WAY TOUGH LUKENS 'T-1' STEEL WELDS AND HANDLES IN THE SHOP"

■ Marion Power Shovel Company's 45 cubic yard stripping shovels now deliver greater payloads with lower maintenance costs and longer service life at the strip mines. Sixty tons of Lukens "T-1" steel in the dipper stick, bail, door, and the dipper itself do the work that once took many extra tons

of ordinary steels. And Marion has experienced "no unusual welding problems since switching to this extremely high yield strength metal . . . very satisfied with the way it handles in the shop."

Lukens "T-1" steel is available in the widest range of plate sizes anywhere.

Figure it in your new plans.

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Do it now!

LUKENS "T-1" STEEL

TRADE MARK



THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS
LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

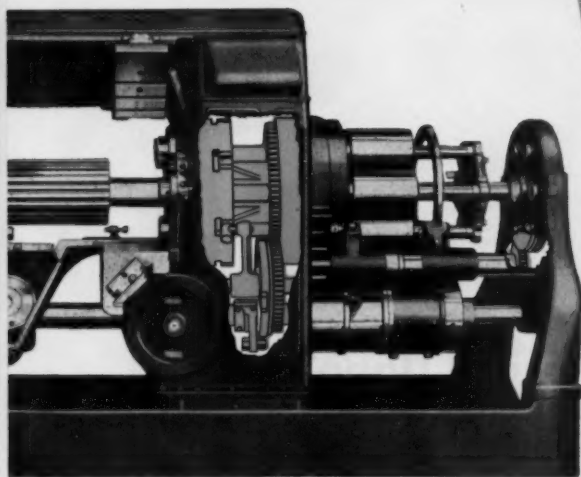
Acme-Gridley



(Left)
1" RA-6
Acme-Gridley
tooled to
complete
the piece in a
single setup—
including cross
drilling and
cross tapping

shockless indexing combined with independently-powered stock reel..

gives greater sustained accuracy...longer machine life



SHOCKLESS, POSITIVE INDEXING of the spindle carrier at high speed is accomplished by a Geneva mechanism. Indexing starts smoothly from a standstill, rapidly accelerates, then decelerates and comes to a dead stop without shock. Accurate location and positive locking of the carrier is assured by the locking pin mechanism.

STOCK REEL IS INDEPENDENTLY POWER INDEXED through a separate shaft and gear. This eliminates torsional strain and any tendency to whipping action, which might cause excessive wear on spindles and spindle carrier.

Acme-Gridleys are at their productive best when performing "secondary" operations during the primary setup—operations which otherwise would require additional time, machine investment, and floor space.

On an Acme-Gridley you can perform operations that require "on-the-button" indexing—such as cross-drilling and cross-tapping in successive spindle positions—with the same fourth-decimal-point-accuracy at the end of the shift as at the start.

And—your Acme-Gridley has power and stamina to spare, at the highest speeds and feeds that modern cutting tools can safely stand.

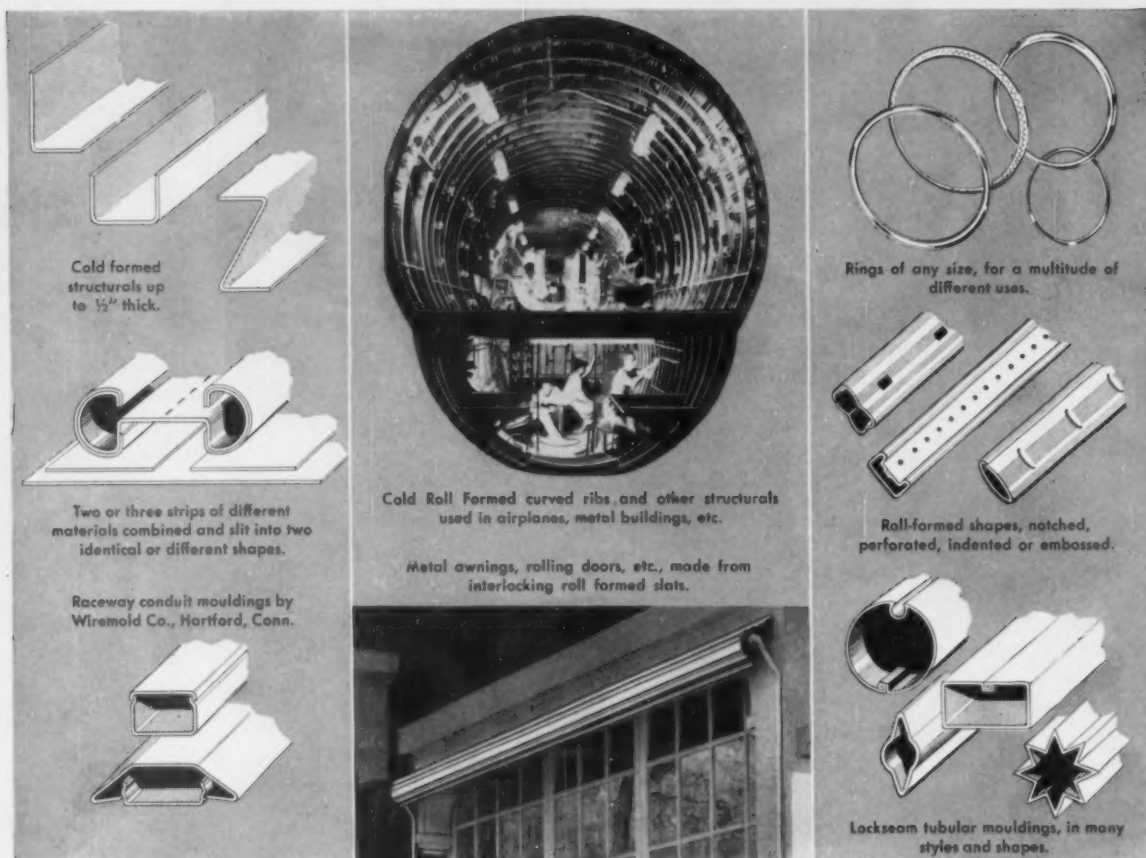
LET US TELL YOU MORE ABOUT *Acme-Gridley* BASIC DESIGN

This is but one of many BASIC DESIGN features which are responsible for Acme-Gridley's outstanding performance records. May we send you additional information? Or, better yet, let us send a representative to discuss possible production short cuts with you.

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Cold formed
structurals up
to $\frac{1}{2}$ " thick.

Two or three strips of different
materials combined and slit into two
identical or different shapes.

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Wiremold Co., Hartford, Conn.

Cold Roll Formed curved ribs and other structurals
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Lockseam tubular mouldings, in many
styles and shapes.

1001 Things Now Being Done By COLD ROLL FORMING

• The basic function of a Yoder cold roll forming machine is, of course, to convert flat rolled strip or sheets at high speed into mouldings, panels, tubular, channel and other shapes.

Quite often, these shapes need further elaboration before being ready for assembly or installation. They may, for instance, have to be curved, coiled or made into rings. Or they may need to be perforated at certain intervals of spacing, notched, embossed, or otherwise finished by additional operations. You may want to combine two or more materials into a finished shape, such as carbon steel with stainless, felt, wood, etc.

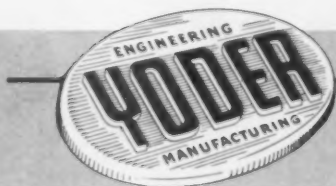
These and many other things can be done with

Yoder machines at little or no extra cost over and above normal conversion costs, simply by providing special attachments, or by auxiliary units installed in line with the forming mill.

So, to the recognized high economy of the cold forming operation itself, other important production economies may be added. Yoder engineers are at your service in designing equipment of this kind.

The Yoder Book on Cold Roll Forming is a complete text, profusely illustrated, on the art and its scope, the machines, their tooling and application to a multiplicity of mass production needs. A copy is yours for the asking.

THE YODER COMPANY • 5510 Walworth Ave., Cleveland 2, Ohio



**COLD ROLL FORMING MACHINES
ROTARY SLITTING LINES
PIPE AND TUBE MILLS—Electric Weld**



Precious Jewel of Industry's Future

"Black Diamonds" are America's most valuable resource for today and tomorrow! Only Bituminous coal can fully meet industry's needs for more electrical energy and more plant-power.

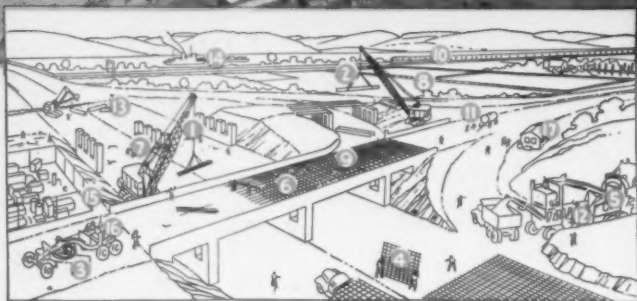
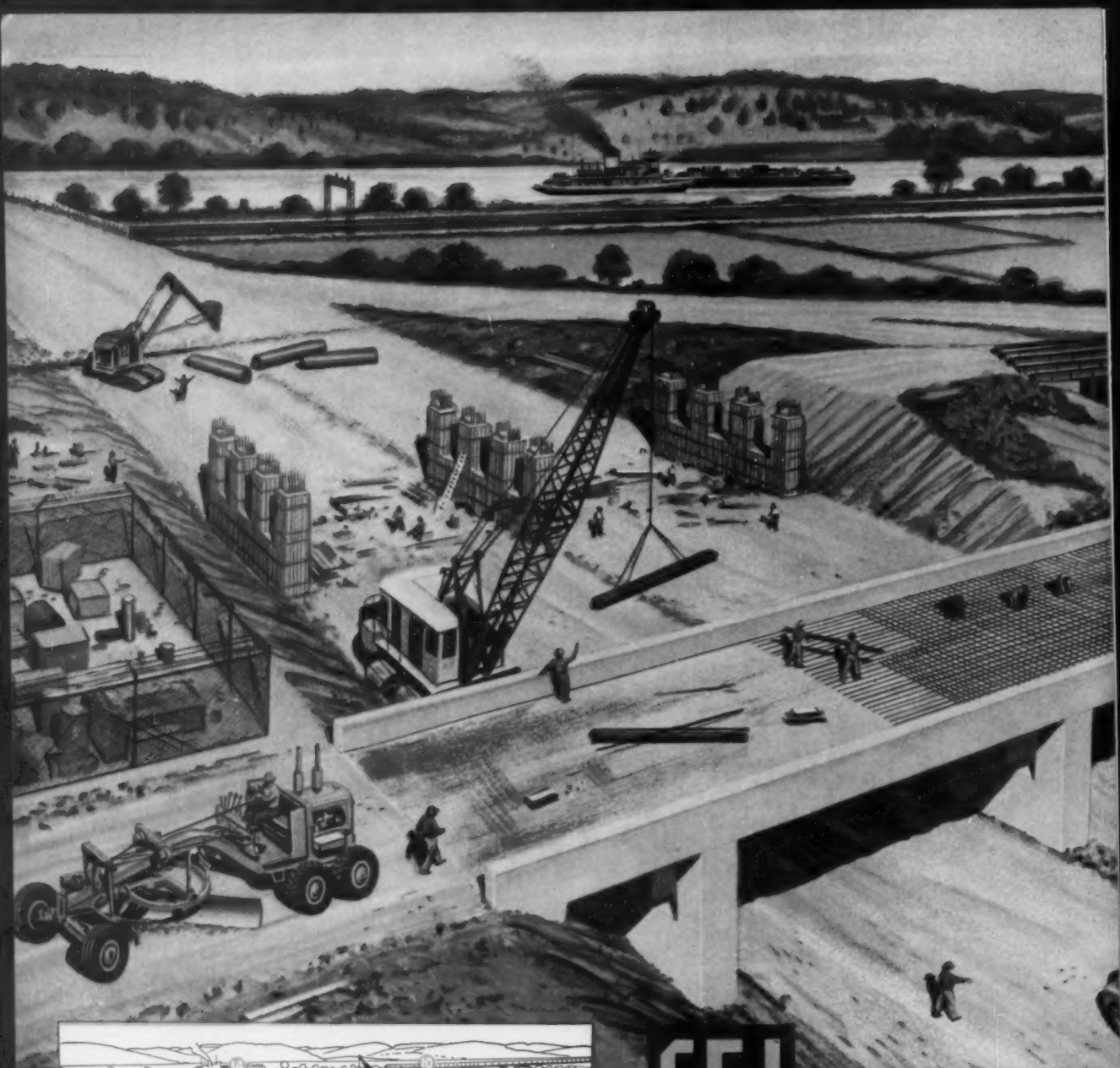
Convenient reserves of B&O Bituminous offer an unlimited supply of coals for every purpose, at low-cost. *Ask our man!*

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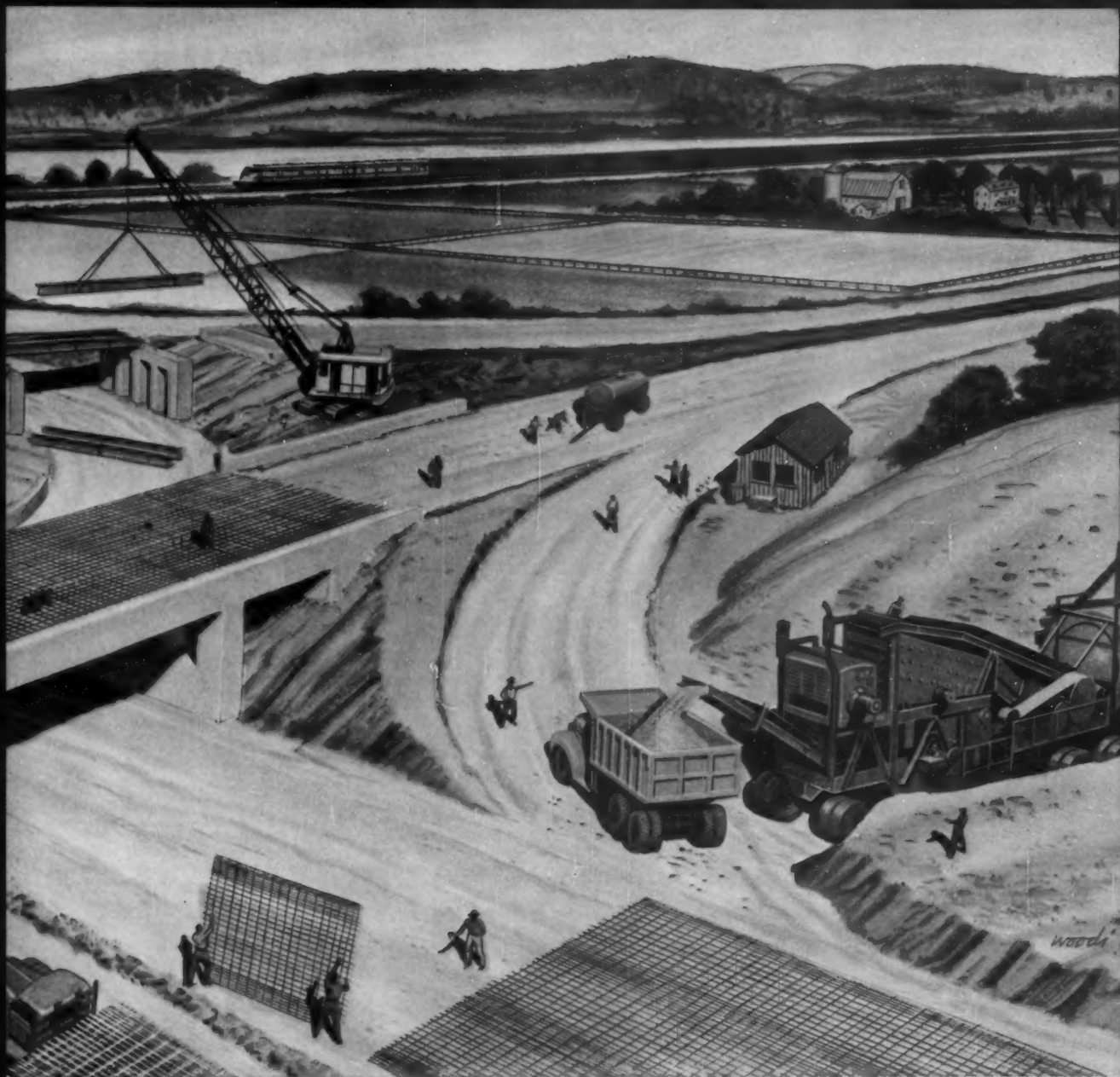
BALTIMORE & OHIO RAILROAD
Bituminous Coals For Every Purpose





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| ④ Clinton Welded Wire Fabric | ⑩ CF&I Rails, Spikes, Track Bolts and Tie Plates | ⑮ Realock Chain Link Fence |
| ⑤ CF&I Industrial Screens | ⑪ Claymont Heads | ⑯ Wickwire Springs |
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PRODUCTS... on the road to everywhere

All over America, efficient road contractors are building a vast network of roads . . . roads which will swiftly and safely carry billions of cars and trucks in the years ahead.

Their's is a difficult task . . . especially since economy must play such an essential part in each project. That's why you'll see so many CF&I Steel

Products on jobs like this throughout the nation—for they perform both difficult and routine jobs swiftly, safely and economically.

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THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Casper • Denver • El Paso
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NOW, speeds from 0 to 180" per minute with new

VICTOR

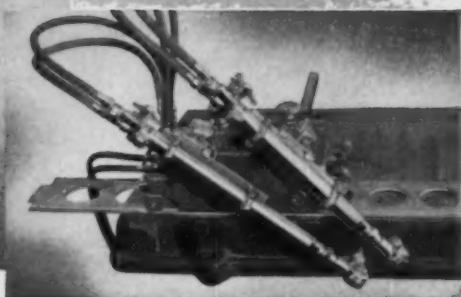
PORTABLE

**Flame-cutting
Machine**

MODEL VU-120



Model VU-120 weighs only 35 lbs. Main wheels run on ball bearings; casters swivel on ball bearings, run on oilite bearings, are shrouded as protection against slag.



Torches on Model VU-120 easily angled for bevel cuts. Machine accommodates both 2 or 3-hose torches, and in certain set-ups each holder can handle multiple torches.

**Operates at same speeds forward or reverse.
Cuts straight lines, circles, square or bevel kerfs.
Adaptable to many automatic welding applications.**

Now constant running motor and 3-position torque-converter transmission of new Model VU-120 bring you speeds from 0 to 180" per minute—forward and reverse—without loss of power at low speeds. In neutral position, machine free wheels so you can set up easily and quickly. Wide speed range enables you to adapt travel carriage to many automatic welding applications, using either submerged or inert arc.

You get remarkable accuracy from the Model VU-120. Floating rear caster practically eliminates side tilt and

wobble. There's no "creeping"—shut off machine and it stops instantly.

Universal torch holder accommodates any model VICTOR machine cutting torch, with or without gear rack. Two torch holders can be used if desired. Case is pre-drilled for extra torch holder, side guide roller, or counterweight.

Try the fast-operating VU-120. Ask your VICTOR dealer for a demonstration on your job NOW . . . or write us for descriptive Bulletin 353.

VICTOR

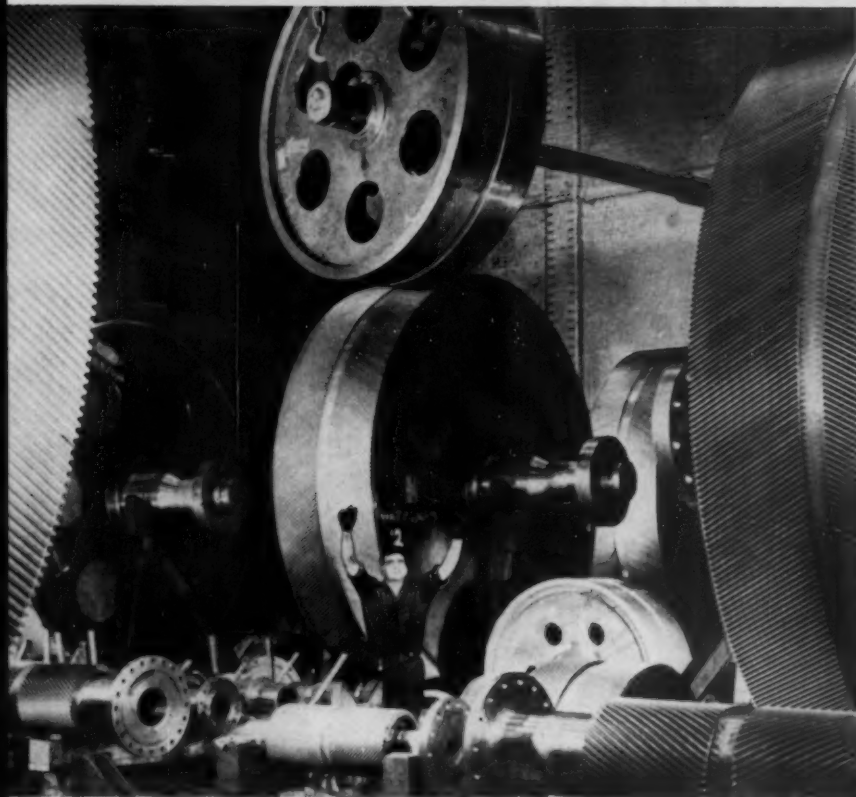
for welding

For maximum efficiency and safety, use genuine Victor tips and parts

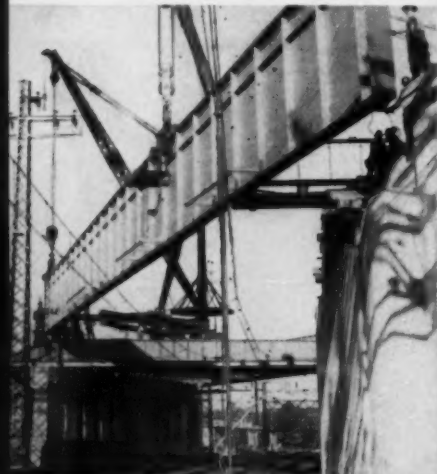
VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods, blasting nozzles; cobalt & tungsten castings; straightline and shape cutting machines.

BARIUM STEEL—active in America's growth

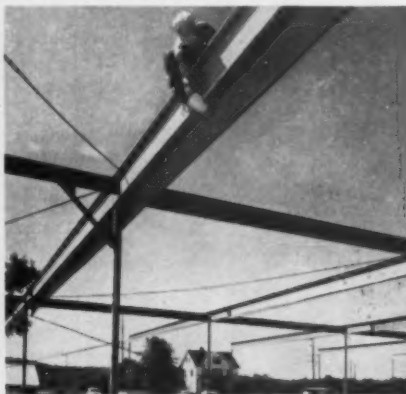


MARINE propulsion gears, an integral part of General Electric ship propulsion units, use steel plate from Barium's Phoenix Iron & Steel Company, Plate Division. These massive web plates are welded to forged steel rims and hubs—the most practical method of construction for large diameter marine gears (up to 16½ feet). In addition to steel plate Phoenix also produces structural steel shapes, heavy wall seamless pipe, and turns out large and small steel fabrications.



HIGHWAY builders timed the installation of this 132-ton, 180-foot-long girder fabricated and erected by Barium's Phoenix Bridge Company at an incredible 27 minutes. This Phoenix-built bridge will carry the New England Thruway over the 4-track main line of the New York, New Haven and Hartford at New Rochelle, New York. Part of the credit for quick work against a tight railroad schedule goes to the Barium-built 100-ton Clyde derrick.

Project of New York State Dept. of Public Works, General Contractors: Arthur A. Johnson Corp., MacLenn Gress & Company, Inc.



BUILDING going up here (New Providence, New Jersey) is a new plant for EXCO, Inc. Structural steel comes from Barium's Phoenix Iron & Steel, Structural Division. Elizabeth Iron Works of Elizabeth, N. J. are steel contractors on this job; they find Barium a good company to work with on small as well as large jobs.



MATERIALS-HANDLING at this East Coast shipyard centers around the Clyde crane above with its 20-ton capacity, 65-foot reach and mobile 70-foot tower. It's only one of many cranes that Barium's Clyde Iron Works has supplied to this customer. If you've got a materials-handling problem coming up, chances are a Clyde crane, hoist or unloader can give you the lift you're looking for.



CONSTRUCTION of New York's 90th Street Heliport began as this Wiley floating crane with its 110-foot boom slammed the first steel pile down to bedrock. Barium's Wiley Manufacturing Company, the nation's largest manufacturer of floating cranes, built this one for George W. Rogers Construction Corp., contractors for the Port of New York Authority. Wiley also produces work boats and steel barges.

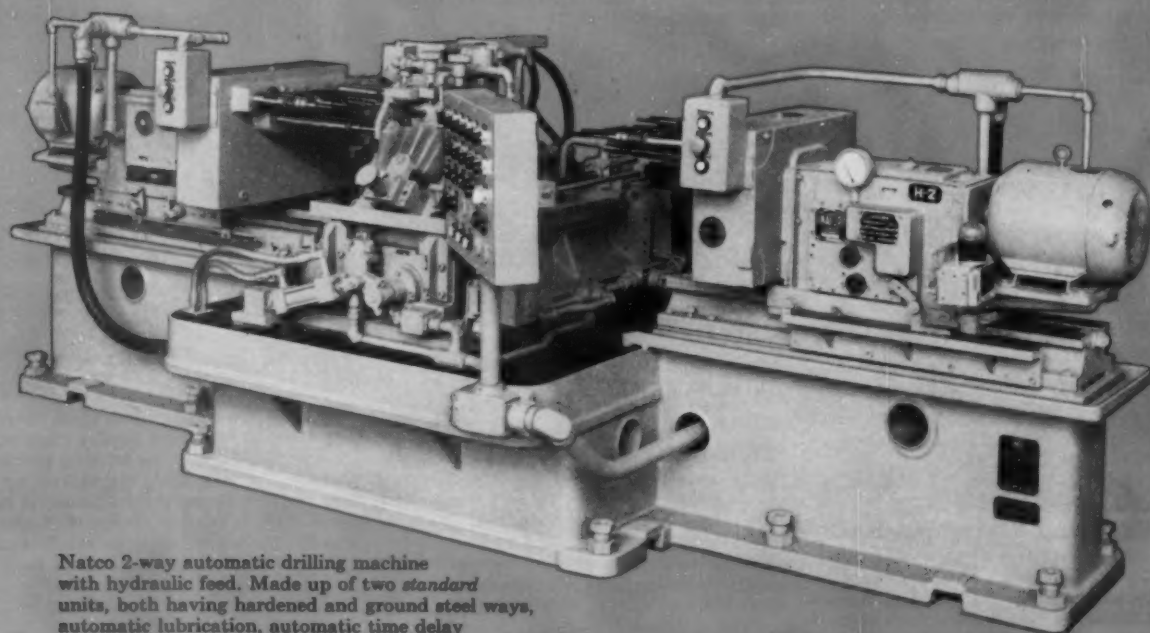
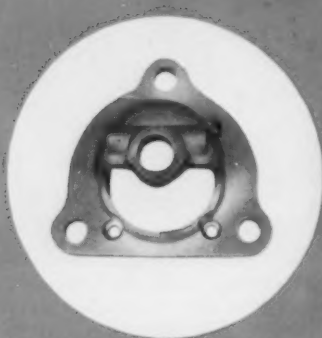


Steel producers, fabricators, product manufacturers

For further information on this close knit, alertly managed team of companies—its engineering resources, production facilities or specific products—write for "The Barium Story" to:

25 BROAD STREET, NEW YORK 4, N. Y.

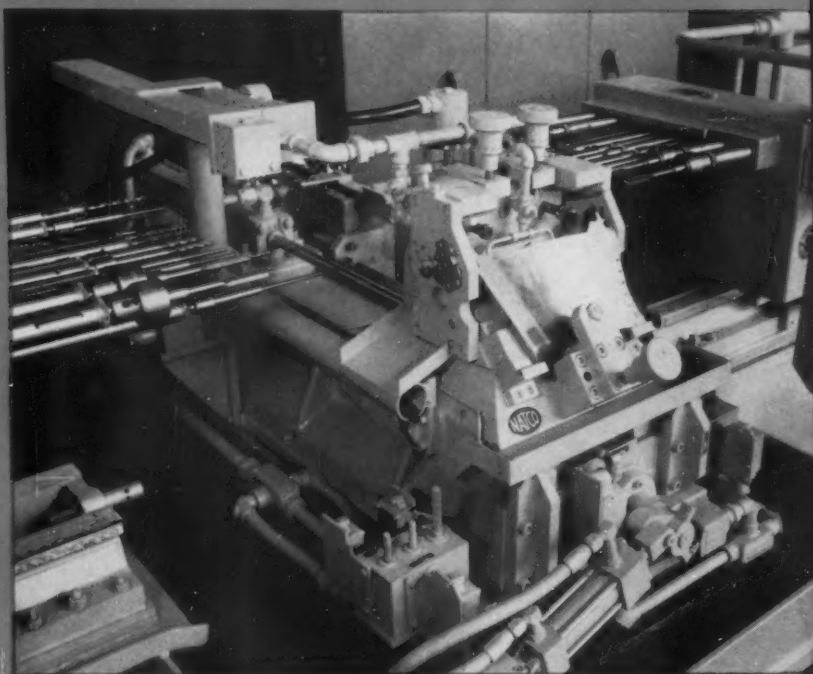
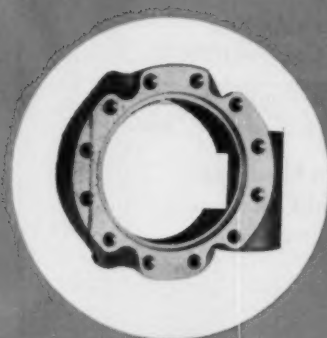
Natco Standard Units Perform Special Jobs



Natco 2-way automatic drilling machine with hydraulic feed. Made up of two *standard* units, both having hardened and ground steel ways, automatic lubrication, automatic time delay and positive stop.

Many *special* jobs can become routine with Natco's *standard* unit design. Take these parts, for instance. Unique parts presenting unique problems. Natco solved them by using *standard* horizontal, self-contained Holeunits with automatic fixtures. Varied operations are performed—production to meet customer's requirements.

Natco's use of *standard* units can mean quicker delivery and lower price to you. Call a Natco Field Engineer to determine whether Natco's *standard* unit design can solve your "special" problems.



Ask for information about the PAYD (Pay-As-You-Depreciate) Finance Plan.

NATIONAL AUTOMATIC TOOL COMPANY, INC.

Richmond, Indiana

Multiple-spindle drilling, boring,
facing and tapping machines.
Special machines for automatic
production.

Call Natco offices in Chicago, Detroit, Buffalo, New York, Boston,
Philadelphia, Cleveland and Los Angeles; distributors in other cities.



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"ALUMON"
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RUST REMOVERS

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Degreasing Compounds

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Since 1930, ENTHONE Incorporated has developed and brought to the metal finishing market many specialty products and processes. Often these products have provided the answers to finishing problems previously unsolved. ENTHONE ENSTRIPS, for example, are patented products for the selective dissolving of one metal plated on another without attacking the base metal.

ENSTRIP A — U.S. Patent No. 2,649,361 — was the first product ever offered for dissolving nickel plate without attack on the steel basis metal.

ENSTRIP 165-S — U.S. Patent No. 2,698,781 — was the first product ever offered for dissolving nickel from copper base alloys without attack on the basis metal. And there are many other selective strippers in the ENSTRIPS group to meet all requirements.

If you have a metal finishing problem, ask ENTHONE first! Write now for the folder "They are HERE..." describing 20 ENTHONE answers to difficult finishing problems.



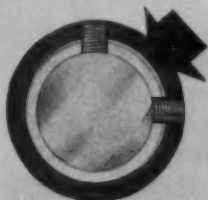
ENTHONE
INCORPORATED

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Metal Finishing Processes • Electroplating Chemicals

MORE FACTS on why more and more leading manufacturers choose Link-Belt bearings



EASY, LOW-COST INSTALLATION—Series 400 bearing blocks are quickly mounted on commercial shafting from 3/4 to 4-in. diameters.



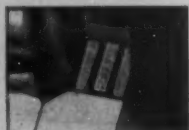
HEAVY COLLAR SECURELY LOCKS INNER RING TO SHAFT. Use of setscrews in collar avoids distortion of inner ring. Tension of collar against heavy setscrews assures tightness.



FREE ROLLING—SELF-ALIGNING. Spherical inner ring is free to align in any direction. Load is distributed over entire roller assuring full load capacity. Destructive edge loading cannot occur.



CONTACT-TYPE SEAL, left, of felt laminated with synthetic rubber for extremely dirty conditions. **LABYRINTH SEAL, right,** for normal conditions. Bearings are pre-lubricated and sealed at factory.



Series 400 roller bearings—complete Link-Belt line includes ball and roller bearing pillow blocks, flange, flange cartridge, cartridge and take-up blocks.

Fast, easy mounting

—a key feature of these self-aligning, high-capacity roller bearings

● Hundreds of equipment manufacturers who use roller bearings choose the popular, high-capacity Link-Belt Series 400. Compactness promotes neatness of machinery design . . . easy mounting reduces installation costs. And field service has developed an unmatched performance reputation because of many valuable features.

Series 400 pillow blocks are equipped with self-aligning, double-row roller

bearings. Even under shaft deflection and misalignment, bearing maintains full load capacity during its long life.

This quality bearing is part of industry's most complete line of ball and roller bearing blocks—made at a Link-Belt plant devoted exclusively to these precision products. For Book 2550 on the full line—ask one of the 40 Link-Belt offices or any authorized stock-carrying distributor.



Ball and Roller Bearings

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,500

How to save on critical alloys and still get high alloy turbine performance

USE "17-22-A" STEELS

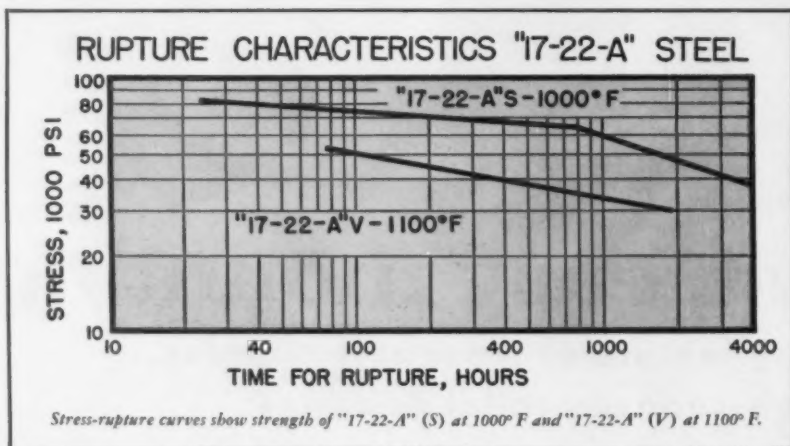
Contain less than 3% alloy... give maximum strength to 1000° and 1100° F

YOU don't have to use an expensive high alloy steel for gas turbine or other parts that operate up to 1000° and 1100° F. You can use "17-22-A" steels made by the Timken Company—*low* alloy steels—to do the same jobs. They give *high* alloy performance, save critical alloys, cut costs. They contain less than 3% alloy, yet they give maximum strength up to 1000° and 1100° F.

You get more advantages. "17-22-A" steels resist heat checking and thermal cracking. They are readily workable up to 2300° F. They are easily machined and

welded. And maximum high temperature properties can be developed by normalizing and tempering, minimizing the possibility of distortion and quench cracking.

Send for complete information on "17-22-A" (S) steel, and its companion analysis, "17-22-A" (V), recommended for temperatures up to 1100° F. Ask for Technical Bulletin 36A. And call upon our technical staff for help with your high temperature steel problems. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO".



TIMKEN *Fine Alloy* **STEEL**

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SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING

B&W Silicon Carbide Refractories for metal-working furnaces

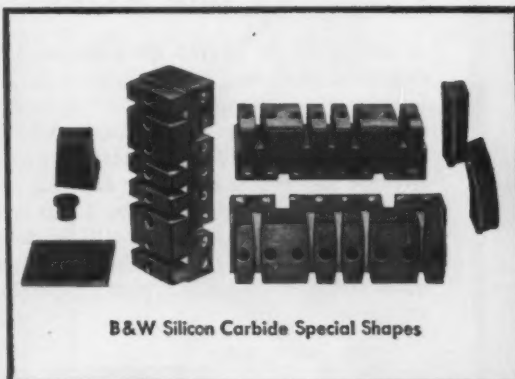
To meet the specialized requirements of the primary metals industry, B&W manufactures Silicon Carbide Refractories in a variety of shapes and sizes. These durable refractories are produced in B&W's Augusta, Ga., works to the same rigid quality control standards used in making all B&W Refractories. See your local B&W Refractories Engineer for further information.



B&W Silicon Carbide Rolls



B&W Silicon Carbide Recuperator Tubes



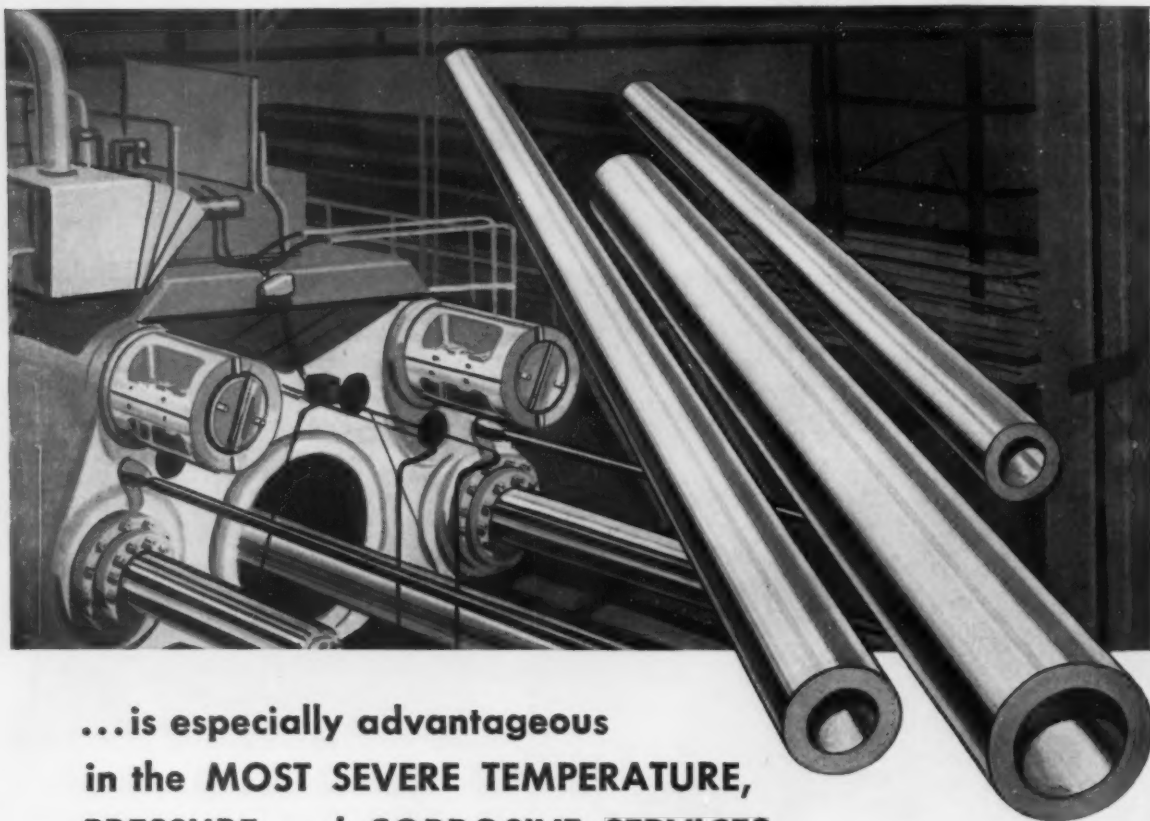
B&W Silicon Carbide Special Shapes



B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick
• B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables,
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HIGH INTEGRITY EXTRUDED ALLOY STEEL PIPE

available from 4" to 22" O.D. in practically any wall thickness



...is especially advantageous
in the **MOST SEVERE TEMPERATURE,
PRESSURE and CORROSIVE SERVICES**

A specially-built 12,000 ton extrusion press — capable of processing any of the stainless or other ferrous alloys — imparts vastly improved mechanical properties to new Curtiss-Wright **HIGH INTEGRITY** pipe. *High ductility with high strength and higher resistance to stress at high temperature* are automatically built into even the largest diameters and thickest-wall products. In the larger diameters, 10" and above, the economics of **HIGH INTEGRITY** pipe are particularly attractive.

Major economies are regularly effected in fabrication and installation . . . using the longer units — up to 50 feet. Ultrasonic testing of all **HIGH INTEGRITY** pipe — combined with the more conventional test methods — assures uniform, dependable, specification quality of delivered product.

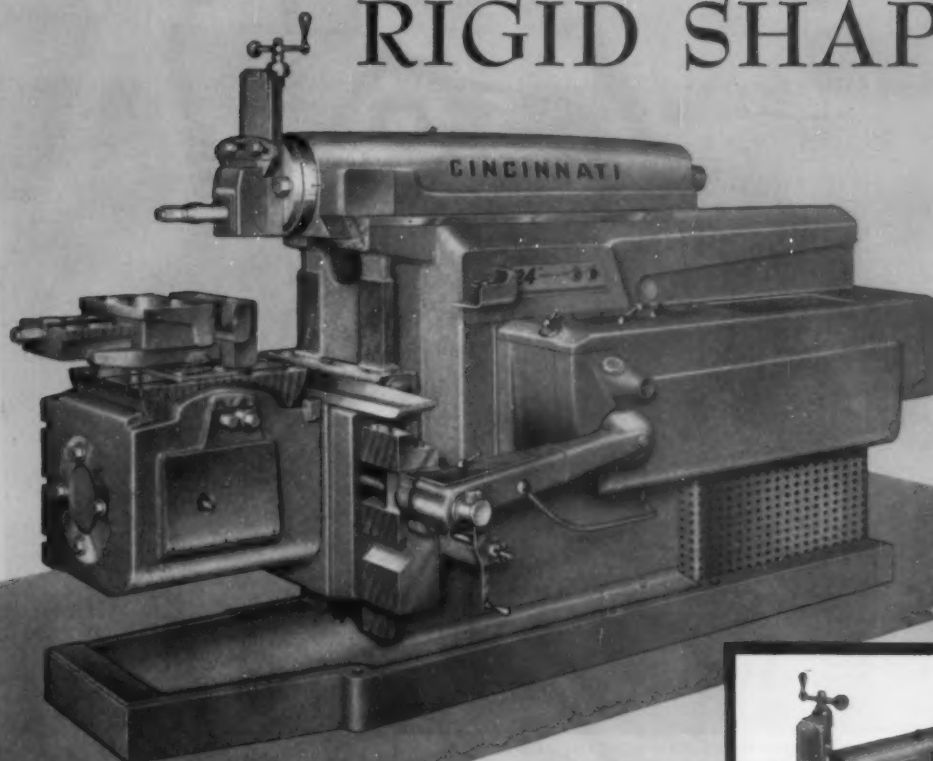
Curtiss-Wright's Metals Processing Division maintains qualified engineering personnel at all branch offices, available for design consultation and specification pricing.

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METALS PROCESSING DIVISION BRANCH OFFICES: NEW YORK • HOUSTON • LOS ANGELES

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New—modern—these Rigid Shapers offer faster, more convenient controls, greater accuracy, greater dependability. The New nodular iron ram and vise body, and wide, heavily ribbed column give a new rigidity—increase accuracy in cutting.

The New slot-free ram also eliminates the manual clamping of ram adjustment—a time saving feature.

A speedy, dependable electro-magnetic brake and clutch insure a faster performance.

50 P.S.I. pressure lubrication, exclusive on Cincinnati Shapers, is a real insurance against wear and a guarantee of long trouble-free performance.

Write for the circular on the New Rigid Shapers.



Nodular iron, slot-free ram



Electro-magnetic Clutch and Brake



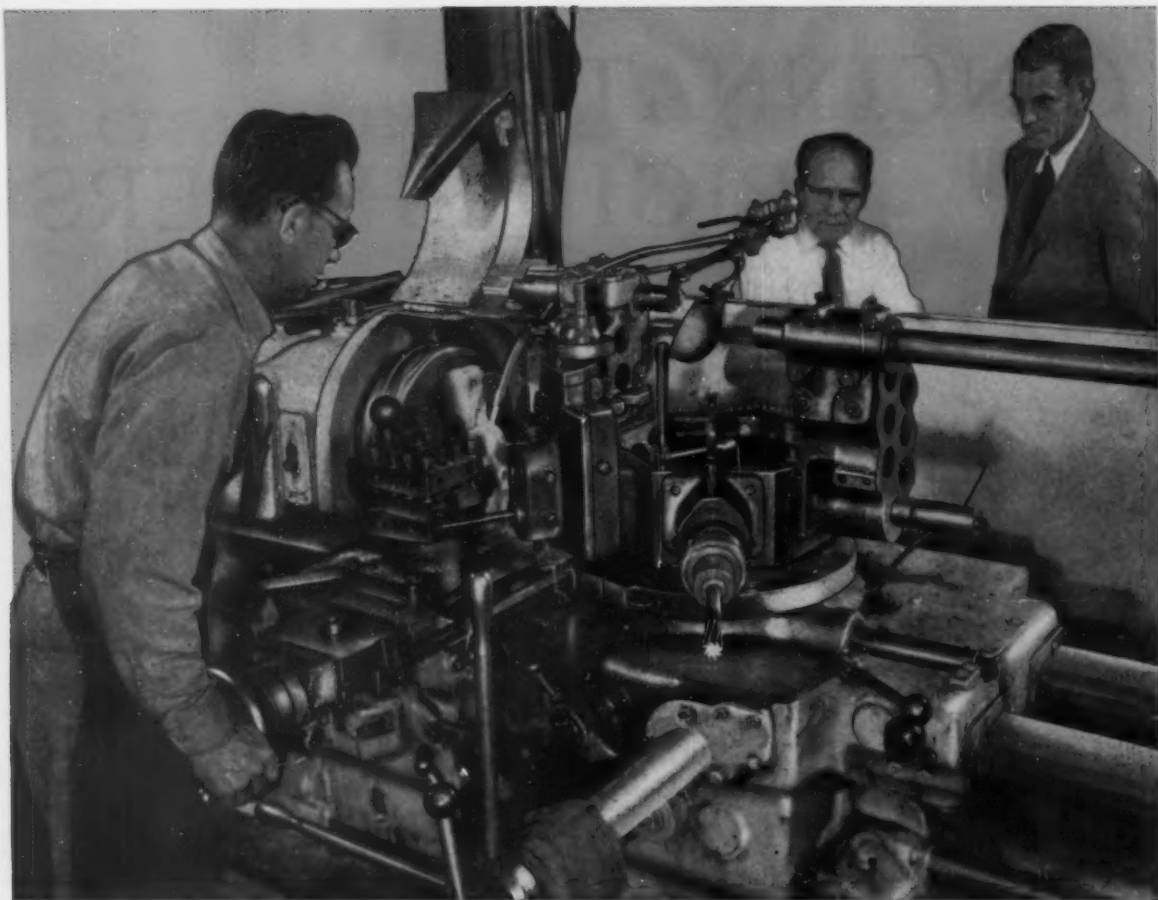
The only shaper with
50 P.S.I. lubrication

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES





Shop Superintendent Bonnafa and Gulf Sales Engineer G. R. Burnham check on performance of Gulfcut 51A as turret lathe turns a stainless steel drive roll for a wire belt.

"Gulfcut gives us longer tool life,"

says Joseph Bonnafa, Shop Superintendent, J. W. Greer Company, Wilmington, Mass.

Shop superintendents like Mr. Bonnafa, engineers and machine tool operators *know* that production can be improved and costs lowered through the use of cutting oils designed specifically for the job. And, they know they can get the right oil for *every* job from the complete line of Gulfcut Oils. Reports like these come from the field every day:

From an aluminum plant: "... stepped up production of aluminum caps 25%, increased tool life well over 100%, and we're getting better threads."

From a plant working tough titanium-alloy

stainless steels: "... results were phenomenal. Tool life increased over 40% and surface finish was improved 43 microns."

Your Gulf Sales Engineer can pin-point your cutting oil requirements—can help you improve shop efficiency through the use of the most suitable cutting oils for your needs. Contact him today at your nearest Gulf Office.

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GULF REFINING COMPANY**
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Every day we're shipping diameters up to 2½", in lengths as required. Occasional special orders call for greater diameters, even up to 4 inches. Of course, size alone doesn't always provide required physical properties. Close attention to steel selection, testing and preparation, strict control throughout manufacturing processes, and final critical inspection assure you cap screws of *known strength* as well as brute size.

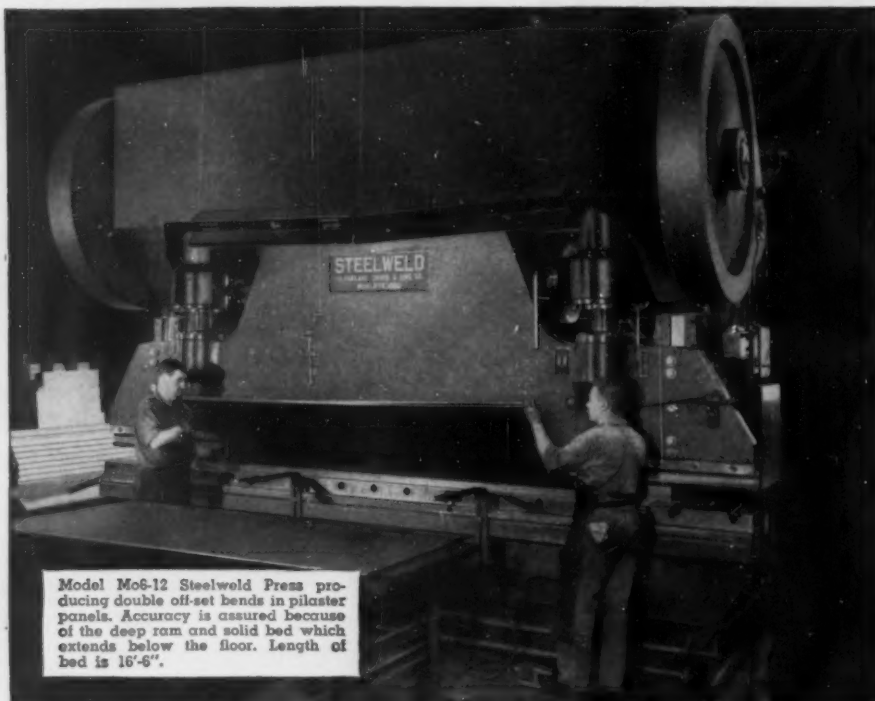
Physical properties of Cleveland Cap Screws in various styles up to 2½" diameter are shown on our handy chart. Write or wire for delivery and price information on extra large Cap Screws.

The Cleveland Cap Screw Company

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Special Press features **SPEED PRODUCTION**



It takes power to make long sharp bends. It takes size and design to assure accuracy. The Mills Company, Cleveland, Ohio, well-known manufacturers of fine metal partitions achieve both with their big 500 ton capacity Steelweld Press.

But more! They also obtain speed and safety. Their machine is provided with several features that are extremely advantageous:

1. Air-electric control for high production.
2. Electric foot switches for easy fatigueless operation.
3. Ram-positioning selector for stopping ram automatically at pre-selected points.
4. Two speeds, 7 or 21 strokes per minute for best operating speed.
5. Reversing flywheel for quick stopping or reversing of ram at any point.
6. Safety dual control permitting operation only when both operators are ready.

The Mills Company are proud of their modern Steelweld Press. It is the largest of several press brakes in their plant. It is in continuous operation, two shifts a day.



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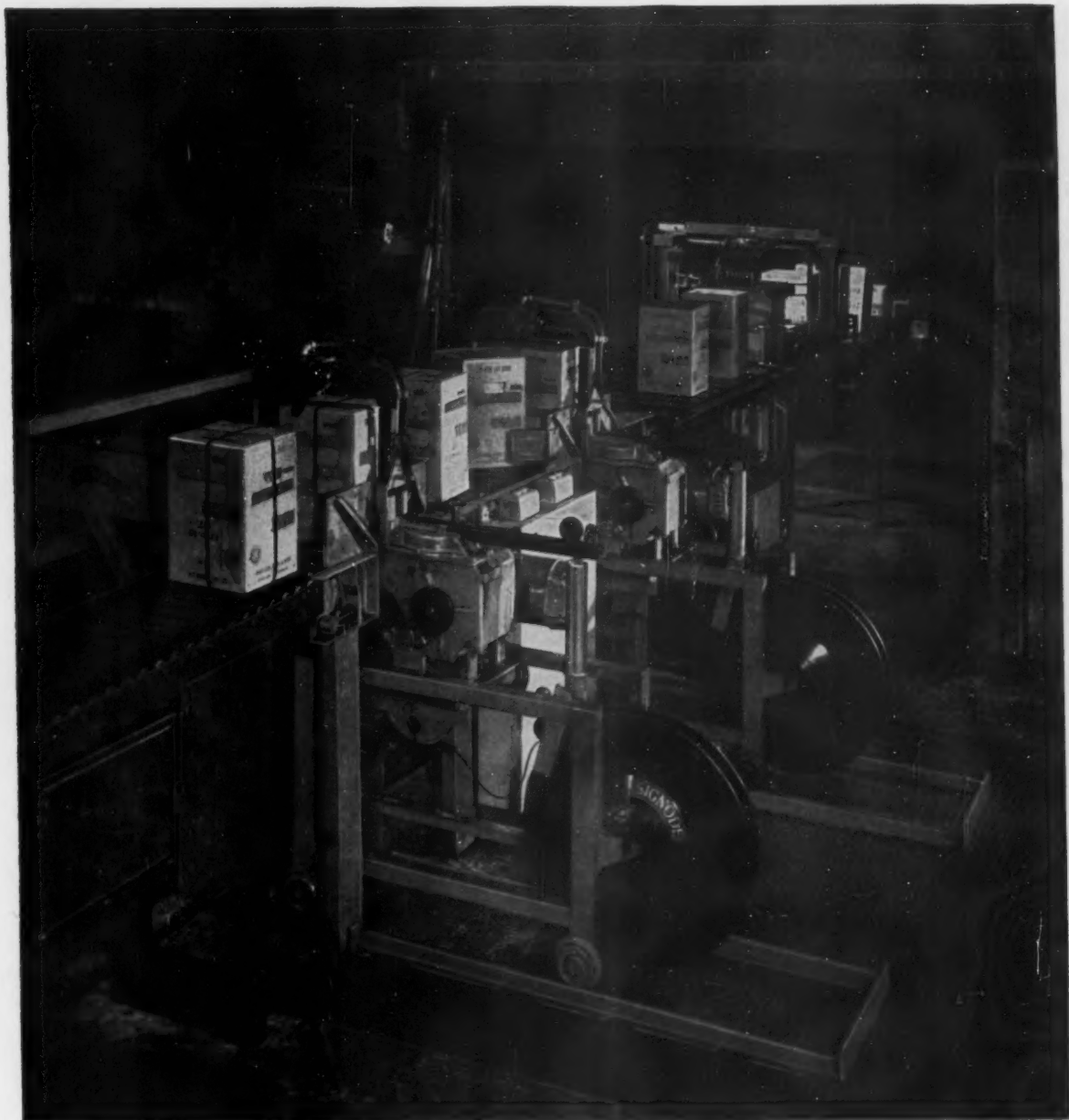
CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

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STEELWELD **BENDING PRESSES**

BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING



Look! No Hands!



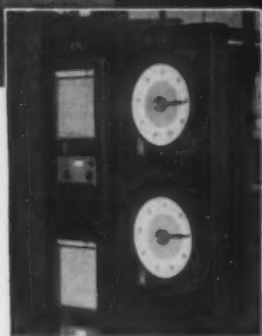
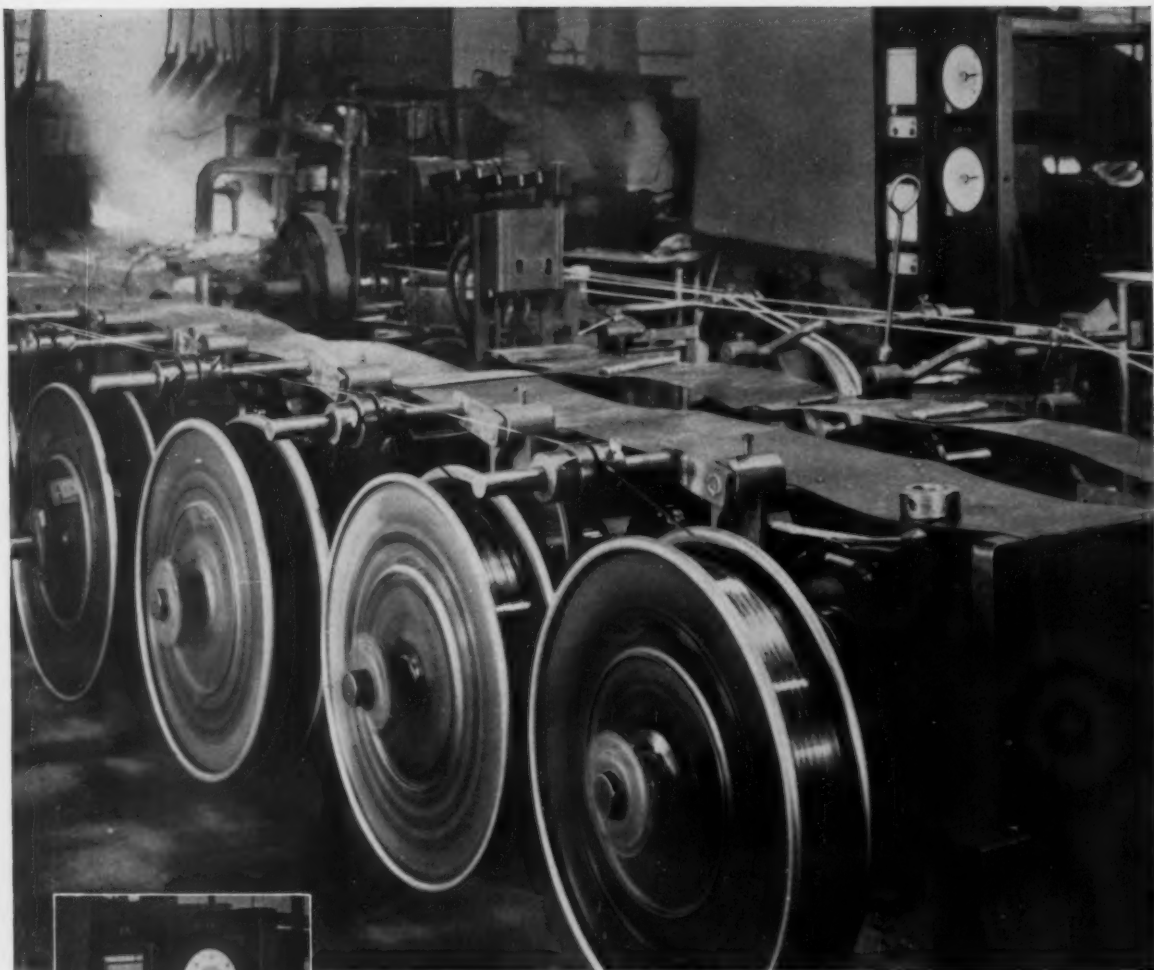
A steady stream of packages get strapped—and nobody's there. These Signode machines do it by themselves. Not all plants are ready for such automation, but these machines are ready and are running in several plants. They are one of many Signode ways to make your product cost less to handle, store, ship and receive. For high strength at low cost, you can't beat steel strapping to hold things together or in place. It will pay you to see your Signode representative. No obligation. Just write:

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AT ATHENIA STEEL

Speedomax[®] H eliminates M.T.C.*

At the Athenia Steel Division of National-Standard Company—flat spring steel specialists—Speedomax H controllers are helping operators meet customer specs on cold rolled flat wire. Since installing these new instruments, production has increased... downtime reduced... and Athenia Steel is assured of the proper temperature for each charge.

In line with its modernization program, Athenia has already completed installation of Speedomax H control on two continuous gas-fired hardening and tempering lines. Former method of control required manual adjustment of valves to regulate gas input to the furnaces. But with Speedomax H, fuel input

is now controlled automatically. Two Two-Position Indicating Controllers are holding temperature of the first two zones of the hardening furnace to better than ± 5 F, and a 3-Action P.A.T. Controller holds the finish zone to ± 2 F. A second 3-Action P.A.T. Speedomax H controller holds the tempering furnace to ± 2 F.

Perhaps Speedomax H can help solve your temperature problems. For further information, contact your nearest L&N sales office or write 4956 Stenton Avenue, Philadelphia 44, Pa.

* Manual Temperature Control



Make speed reduction A COST-REDUCTION FEATURE of any drive design

When you design around the 100 SERIES, you can be sure that any model you need is available promptly, — from stock. You can be sure, also, that any BOSTON GEAR Speed Reducer will take top-rating in any test for operating efficiency, and lasting power economy.

Get complete information . . . call your local BOSTON GEAR Distributor and talk to the transmission specialist. Boston Gear Works, 72 Hayward St., Quincy, Mass.

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types and ratios
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BOSTON *gear*

100
SPEED REDUCERS

RATIOMOTORS

Output RPM
.49 to 175

REDUCTORS

Ratios 1:1
to 3600:1

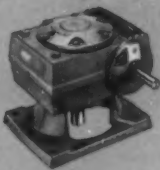
Fan-cooling optional
on larger sizes



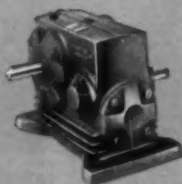
Horizontal Right Angle Drive
Worm Gear over



Horizontal Right Angle Drive
Worm Gear under



Vertical Right
Angle Drive



Double Reduction
Horizontal Parallel Drive



Double Reduction
Vertical Right Angle Drive



Horizontal Right
Angle Drive



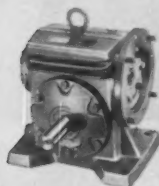
Double Reduction
Horizontal Parallel Drive



Vertical Right Angle Drive



Double Reduction
Vertical Right Angle Drive



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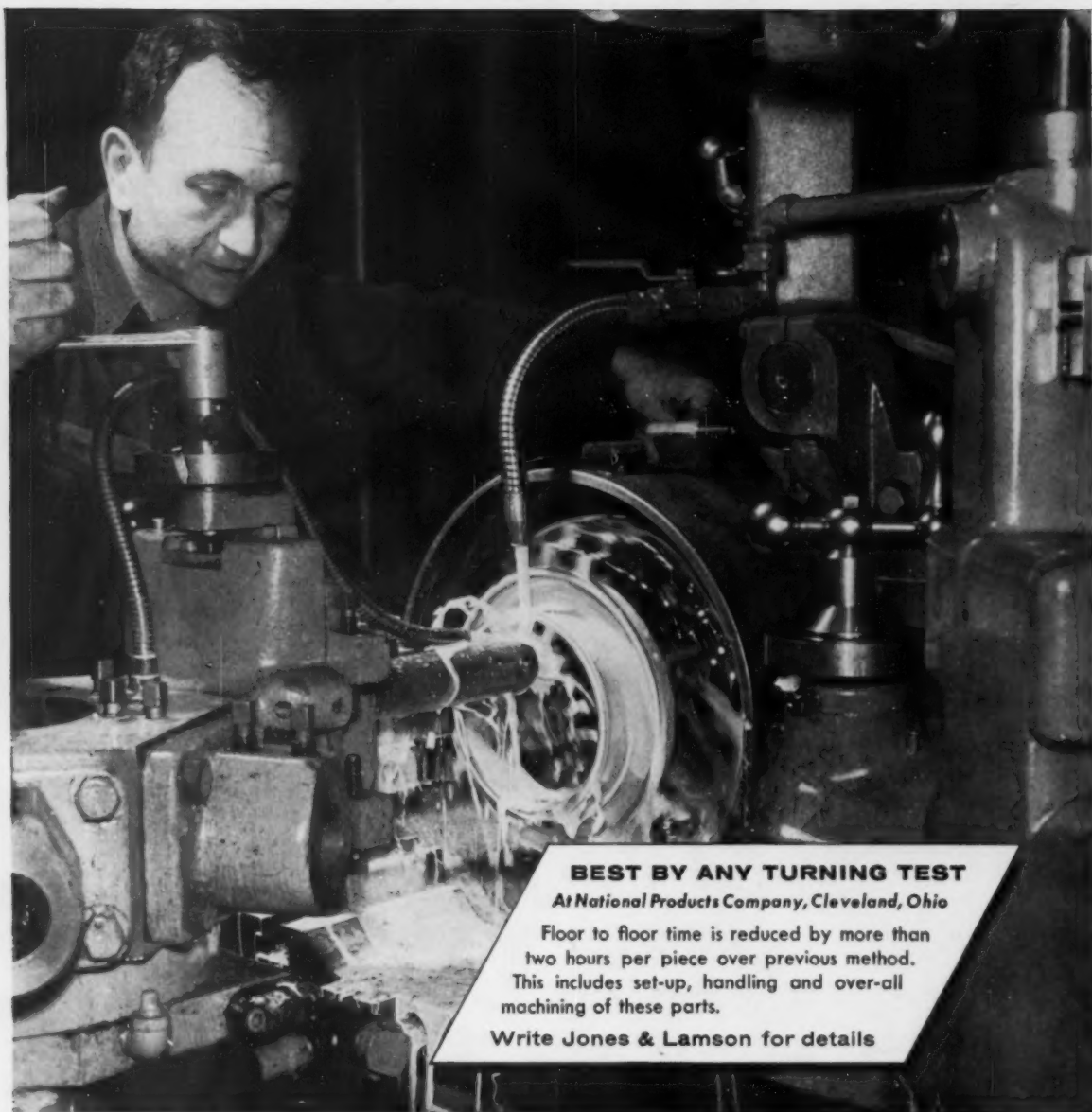


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▲ **Increases Durability of Buckets.** Oaks Welding, Incorporated, Columbiana, Ohio, repairs mining equipment on a custom basis. They rebuilt the 4½-yd. dragline bucket shown here with USS "T-1" Steel. Sides, bottom, and runners were made from USS "T-1" Steel . . . are actually far stronger and more durable than when the shovel was new . . . are better able to withstand severe impact abrasion in all kinds of weather.



▲ **Simplifies Fabrication.** Fairmont Machinery Company, Fairmont, West Virginia, is using USS "T-1" Steel in thicknesses up to ¾ inch to build an *unlined* coal storage bin. "T-1" Steel's abrasion and corrosion resistance make it an ideal choice for this type of service. In fabrication, high-yield-strength USS "T-1" Steel was cold-formed on equipment normally used to form carbon steel. It will be welded in the field to cut costs. It will be simpler to build, because it will need fewer stiffening members and will be lighter in weight than typical coal storage bins.

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USS "T-1" Steel, with its high minimum yield strength of 90,000 psi and its minimum tensile strength of 105,000 psi, can help you design or build lighter-weight equipment that will last longer. Its unusual toughness can help you design or build equipment capable of taking severe impact abuse at sub-zero temperatures. Its excellent weldability can help you to cut the cost of fabricating highly stressed parts and to reduce repair and maintenance expenses. Its good creep rupture strength can help you to put more durability in equipment that operates at temperatures as high as 900 degrees F.

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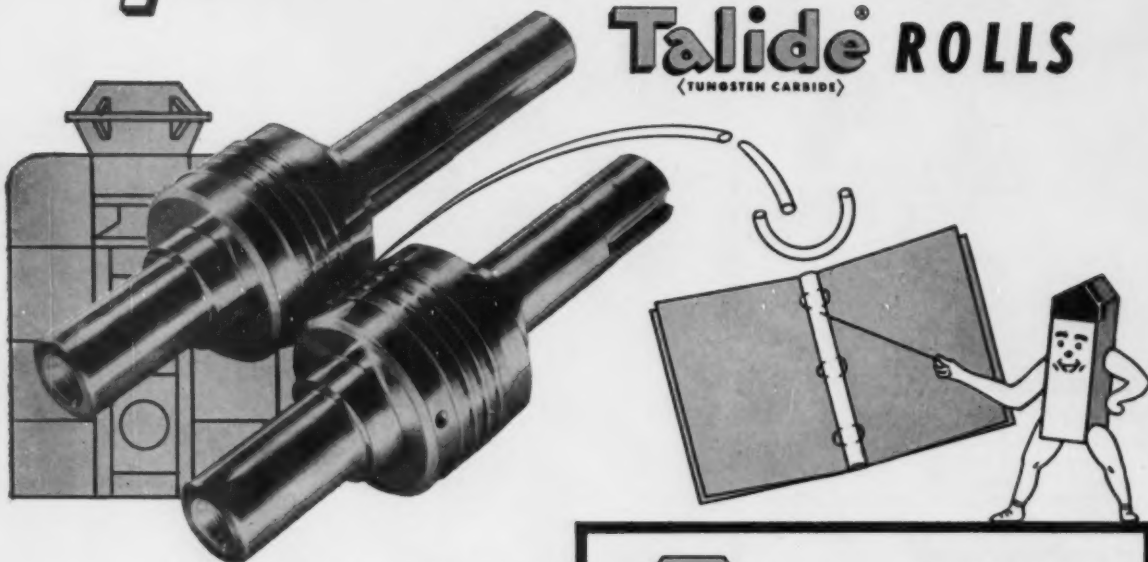
USS "T-1" CONSTRUCTIONAL ALLOY STEEL

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UNITED STATES STEEL

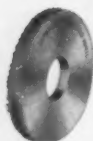
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● A large Eastern Producer of oval-shape wire for loose-leaf notebook rings was experiencing excessive wear and pick-up. The high scrap rate was making the item unprofitable. Metal Carbides service engineers were called in to determine if Talide rolls could correct the trouble. Hi-carbon wire was being reduced on a 2-hi cold rolling mill to an oval shape .100" thick x .156" wide. Considerable stress and pressure was required to deform the wire to proper shape.

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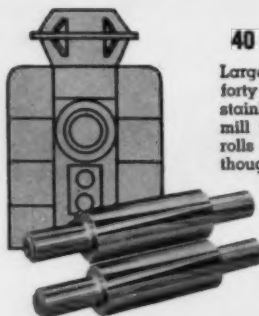
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Broken or damaged carbide rolls can be re-worked to first class condition with all defects eliminated at one-half original cost. Only Metal Carbides offers this service—because of its exclusive hot press method.

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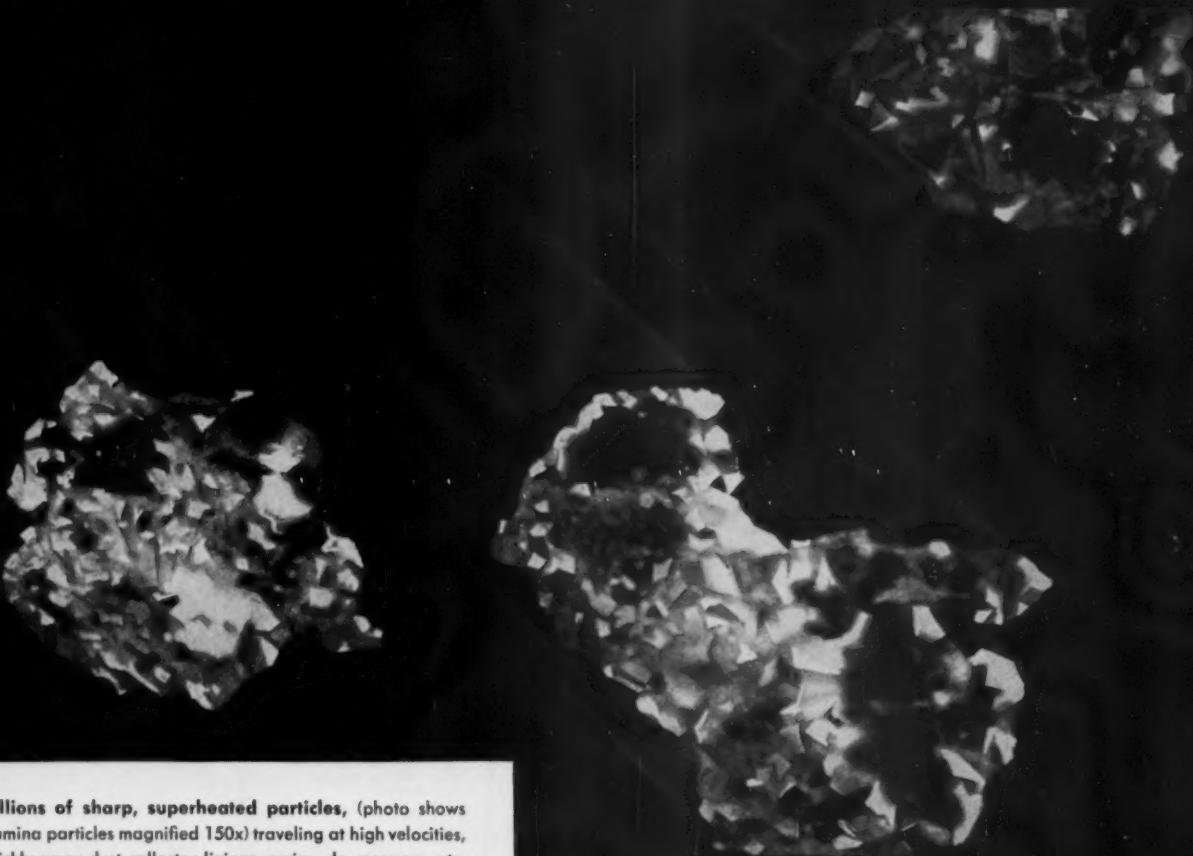
All users of Sendzimir rolling mills have adopted Talide work rolls because operating results have been phenomenal, far surpassing all expectations. Tremendous production runs are commonplace with mill after mill reporting increased tonnage runs between roll changes of 278-1, 179-1, 82-1, etc.



Talide Rolls are made in lengths up to 100", diameters up to 25", and up to 5000 pounds by weight.



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Unequalled resistance to abrasion whether caused by tiny gas-borne particles or sliding steel billets—is one of the most useful properties of CARBOFRAX® silicon carbide refractories. For example, a CARBOFRAX dust collector lining on an ore sintering machine is still in use after 10 years service.

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Wear resistance is not the only unusual property of these refractories. They also offer heat conductivity roughly 11 times that of fireclay, with sufficient hot strength to withstand 25 psi at 1720°C. CARBOFRAX refractories are but one of many super refractories pioneered by Carborundum and offering a wide range of unusual properties.

Carborundum's new magazine "Refractories" pinpoints many practical applications for these unusual products. The forthcoming issue carries a feature article on "Wear Resistance". Send for your copy today.

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Consumer products must also have "sales appeal" appearance.

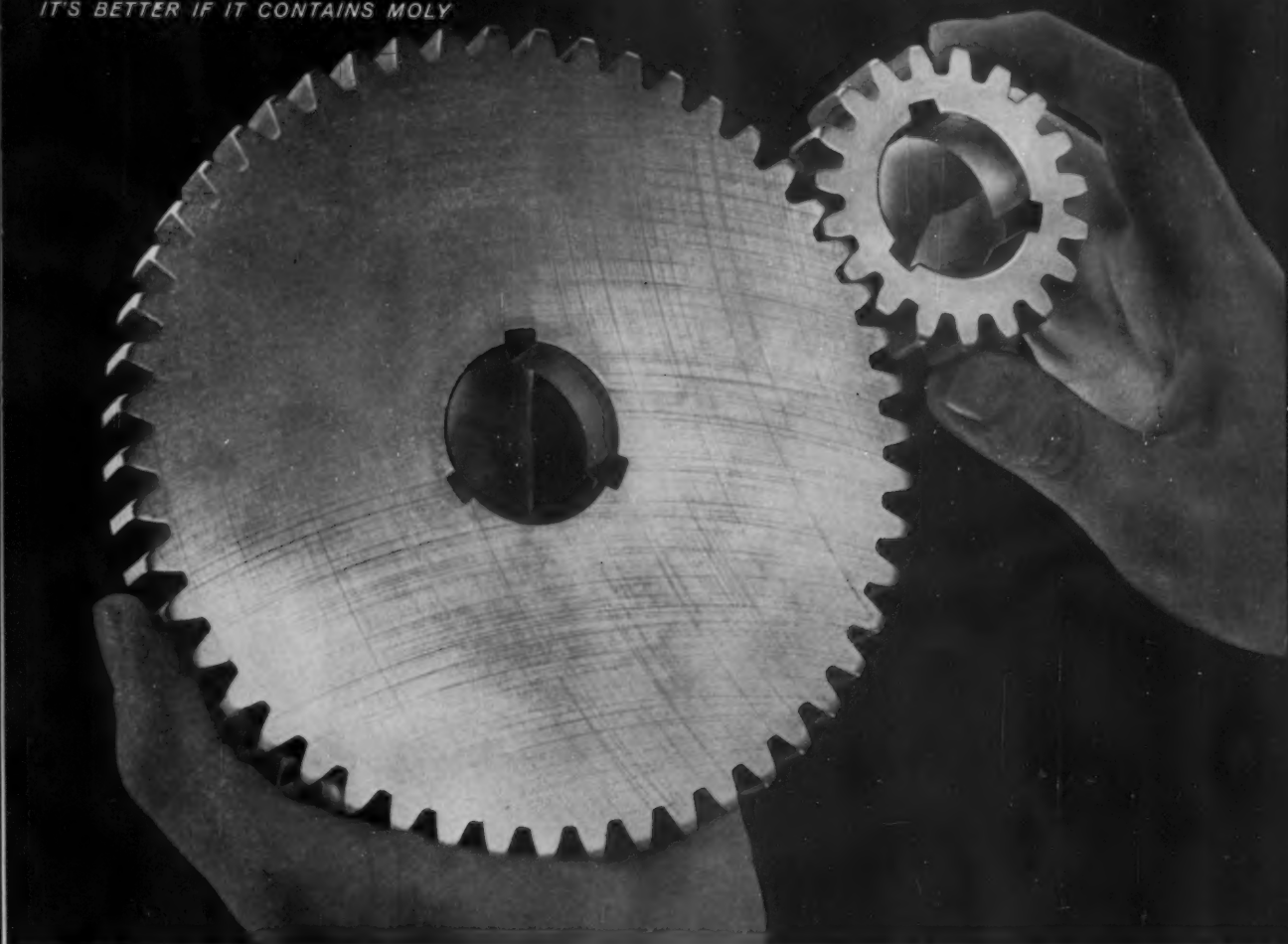
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If you use carburizing steels, see what a higher molybdenum content can do for you. Part of the story is contained in the technical article "New Carburizing Steels For Critical Gearing." For your copy, or other technical data, write Climax Molybdenum Co., Dept. 2, 500 Fifth Avenue, New York 36, N. Y.

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... We'll be glad to supply engineering assistance, and actual samples of these 200-Series steels for testing under your processes and conditions.

ADDRESS DEPT. A-83

Here is a direct answer to the recurring problem of nickel shortage. For many users of chromium-nickel austenitic stainless steels, the new AISI 200-series of chromium-manganese low-nickel austenitic grades can be a source of immediate relief—and an avenue to the reduction and possible avoidance of nickel shortage problems in the future.

In many cases, you can switch directly from the older Type 301 and 302 grades to the new AL Stainless Type 201 and 202 steels, using the same fabricating processes and securing about the same results. There's nothing new to learn, and no loss in performance in practically all applications. In

certain respects, these steels have better properties than the older materials and may be used to actual advantage in some cases.

We also produce low carbon grades of these chrome-manganese steels, arbitrarily designated Types 204 and 204L (similar to the older grades 304 and 304L) ... as well as a lower-chromium, higher-manganese grade designated Type CM, which contains only 1% nickel. Allegheny Ludlum has pioneered in the development and application of these low-nickel stainless steels. We know what the new grades will do ... let us help you put them to use. *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

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*These are the rates for most commodities. They are often lower for larger shipments. Rates shown are for information only, are subject to change, and do not include the 3% federal tax on domestic shipments.

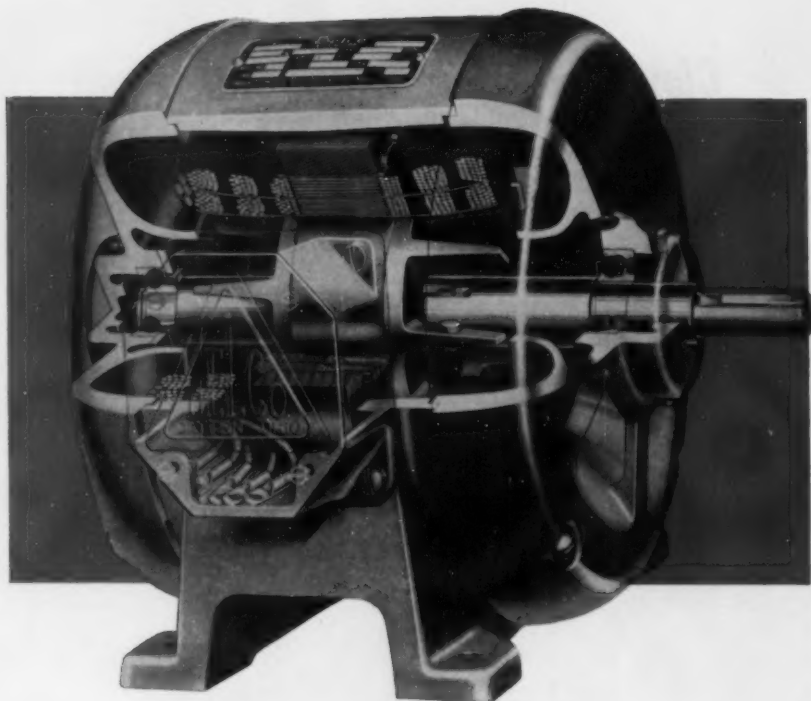
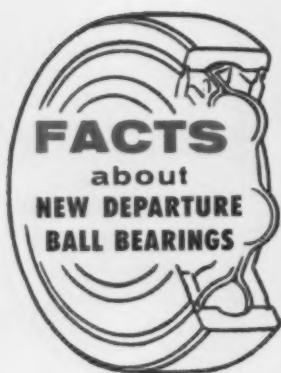
YOU'RE DOUBLY SURE ON UNITED—Space for your shipment on the flight you want is guaranteed by Reserved Air Freight. . . . Weather-mapping radar on United's DC-6As helps assure that your shipment will arrive on schedule. . . . There's assurance, too, in United's round-the-clock schedules and in United's kid glove cargo handling procedures.



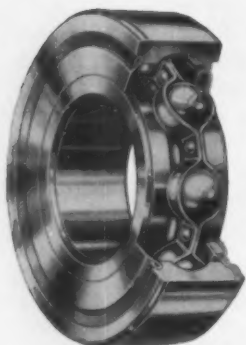
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BALL BEARINGS CUT LUBRICATION MAINTENANCE TO VIRTUALLY ZERO



Precision-made New Departure ball bearings assure permanently accurate support of the rotor shaft under all load conditions and mounting positions, plus cool-running, quiet bearings at all speeds.

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BALL BEARINGS MAKE GOOD PRODUCTS BETTER

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NEW DEPARTURE
BALL BEARINGS



NOTHING ROLLS LIKE A BALL

NEWSFRONT

Tooling Outlook: Bright For '57

More and more, '57 looks like another good year for tool and die firms. They're reporting good business booked—not up to '56's record highs, but healthy nonetheless. Most special machine tool builders are loaded with orders, some into '58. Standard machines are going well too, with deliveries of some popular items such as boring mills pushed back to late summer of next year.

Stainless Poses Auto Problems

With more stainless steel appearing on 1957 cars, some automakers are worried about its availability. Predictions are the '57 models will use a total 10 to 12 pct more stainless. But with nickel-bearing stainless almost impossible to get, some auto executives are doubtful that there'll be more nickel available next year for stainless uses.

More Direct-Reduction Iron Interest?

Record scrap prices may spur renewed interest in direct-reduction methods of ironmaking. Electric furnaces now rely largely on scrap for their charge. Fluidized solids reduction of high-quality iron ore provides a product which can be more economically charged. Other advantages would be greater flexibility possible in furnace operation and the removal of production ceilings set by scrap supply.

Merchant Pig: Still Running Lean

Hard-pressed to keep up with current needs, merchant pig producers see little relief in sight. One producer has turned down export business as far ahead as 1958. A major steel mill is withdrawing from the merchant pig business altogether. Another, while meeting old commitments, is forced to buy pig iron to meet its own requirements.

Army Set For Aerial Jeeps

Field tests of an "aerial jeep" for military use are to be started by 1959. Plans call for the mighty mite to mount two rotors; lug around

a payload equal to its own 1000 lb weight. It will mount radio sets, machine guns and possibly a 106 mm recoil-less rifle. Army sees it for short range patrol work.

Bainite: Is It Good Or Bad?

Is bainite in low alloy steels helpful or harmful? Latest research seems to support a yes-and-no answer. Tensile strength is not improved by a mixed bainitic-martensitic structure. Damage to ductility from bainite content becomes more pronounced at higher strength levels. In very small amounts, bainite exerts negligible effects on performance.

Demand For C-R Sheet Picks Up

While many warehousemen contend they're overstocked on cold-rolled sheet inventories, a check of consumers indicates they're upping their take. At least one important customer has been buying more than his normal warehouse tonnages since July; last week was upping the figure again. He'd just received news that his cold-rolled sheet mill allotment for December was being revised downward slightly.

Fencing In Ceramic Applications

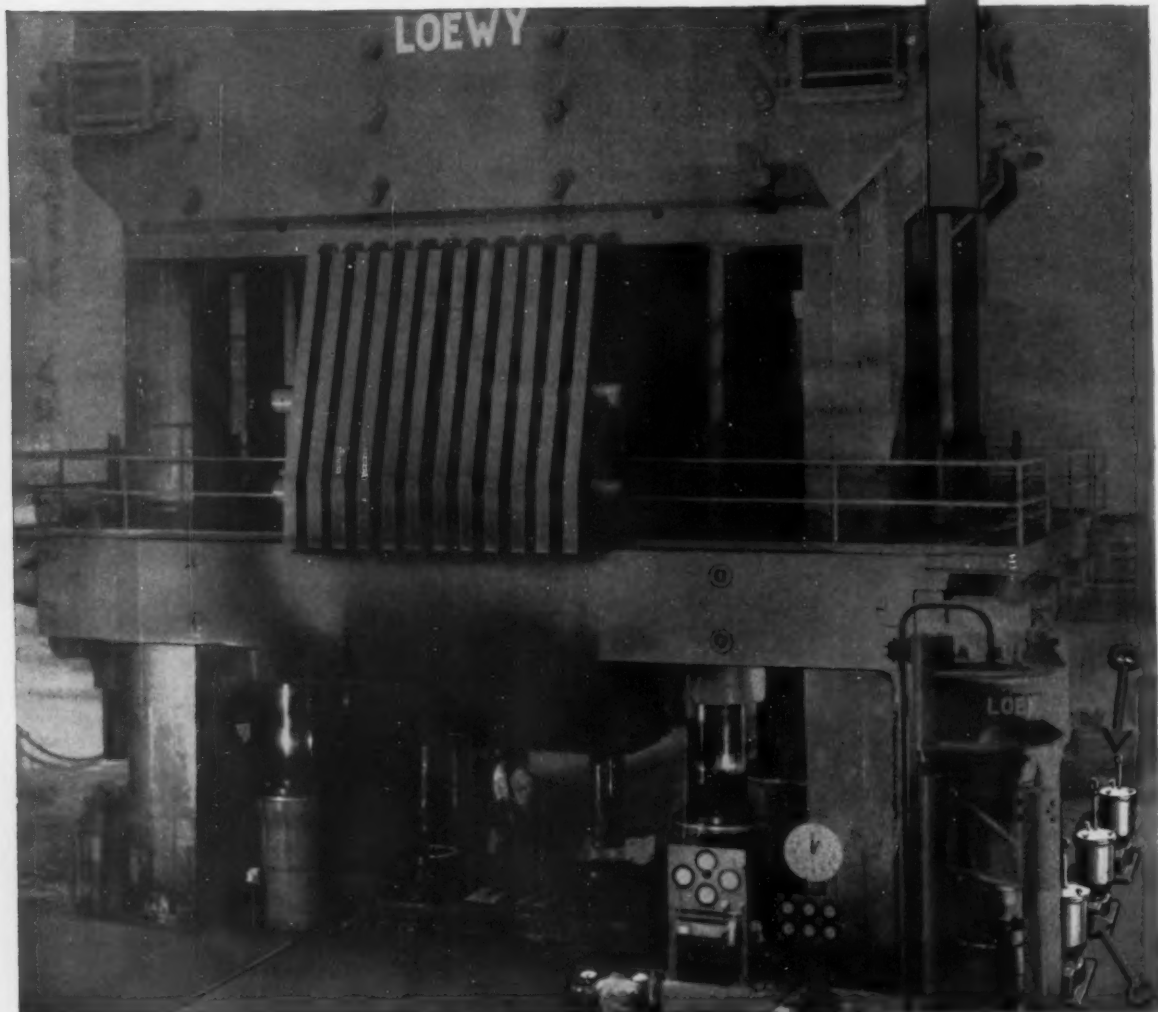
Ceramic and cemented oxide tools find their best machine shop applications in four areas, a recent technical society panel decided. The areas: (1) where material being cut runs less than 50,000 psi unit shear strength, (2) on clean, unscaled surfaces, (3) on nonmetallics, including unfused ceramics and oxides, (4) on finish turning of high-tensile steels using uniform depth of cut.

Nuclear Power: All Answers Aren't In

Formidable problems still confront nuclear power plant builders. Superimposed on the still tricky problems of conventional power plants are new ones involving corrosion, unusual properties of fissionable and other special materials, and new heat transfer media. Radiation factors also figure in; affect stability of materials, handling and inspection techniques, as well as health. All need extensive study.

Loewy 50,000-ton "Major" forging press is automatically lubricated by Farval

FARVAL—
Studies in
Centralized
Lubrication
No. 196



● It takes only one man at the control pulpit to operate this huge 11-story press—the world's largest machine. Designed and built by Loewy-Hydropress Div. Baldwin-Lima-Hamilton of New York for the U.S.A.F. Heavy Press Program and operated by the Wyman-Gordon Co., it can exert 108 million pounds' pressure to form hot aluminum billets into structural parts for jet planes.

Adequate lubrication—and always dependable—helps this machine work to greater precision tolerances than ever before thought possible in a forging press. Lubrication is by Farval—a total of 205 bearings served by four systems—three heavy-duty automatics for the lubrication of the press proper and one manual for the lubrication of the controls.

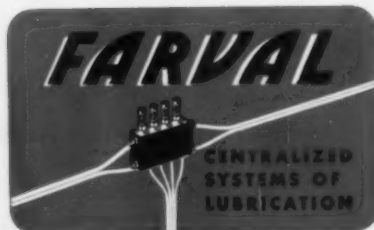
Farval Centralized Lubrication Systems are serving millions of bearings in all kinds of industrial equipment. Farval is ready to serve you, too. Call the Farval representative near you, or write us for Bulletin 26-R. The Farval Corporation, 3282 East 80th St., Cleveland 4, Ohio.

*Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing.
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KEYS TO ADEQUATE LUBRICATION—

Wherever you see a Farval central pumping station, dual lubricant lines, and valve manifolds, you know a machine is being properly lubricated.

Three Farval heavy-duty automatic pumping stations that lubricate "Major" are to be seen at lower right.





Conveyors Move Men, Not Just Materials

Weirton's 3-story conveyor may start new industry trend . . . Moves men to consolidated locker room after shift ends . . . Advantages include practical results as well as convenience . . . Others planned,

♦ **THE PASSENGER** conveyor has moved into industry. The idea of moving workers through a plant on an endless belt has made a modest breakthrough at the Weirton Steel Co. It could be a foretaste of what the metalworking plant of the future will be like.

Enthusiastic advocates of the passenger conveyor in industry point out that at least one aircraft plant is considering something similar to what Weirton has done. So are a tire producer, a refrigerated food warehouse, and a mine operator.

Not a Gimmick

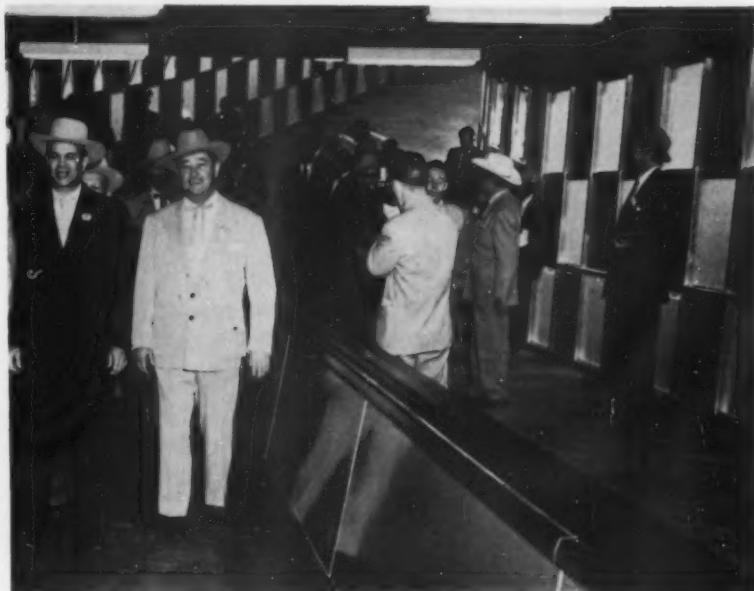
The Weirton breakthrough strengthens the arguments of conveyor builders that smooth, uninterrupted movement of workers to and from their machines is more than an industrial relations gimmick—it can save time and money.

The installation was part of a program at Weirton to consolidate locker room facilities into one large area. The one large facility replaces six former smaller locker rooms scattered through the building.

The Weirton installation is a four-unit moving sidewalk at its 54-in. strip mill. It is designed to move 734 workers from the operating floor of the mill to the locker room three and one-half floors above.

Advantages

The workmen step on a belt 24 in. wide, are moved up a 13° incline at a rate of 132 fpm—half normal walking speed. In 12 minutes, the installation lifts 734 men



INDUSTRIAL APPLICATION of human conveyors was preceded by a number of commercial installations such as this 82-in. wide Beltwalk at Sam Houston Coliseum, Houston. Link-Belt photo.

41 ft 9 in. in vertical distance. It could handle 3600 persons an hour in full hour-long operation.

What are the advantages? Here's what Edwin O. Burgham, Weirton president, says:

"The speedwalk was installed in the interest of comfort, convenience, safety and health of our employees. At the end of their day's work, it will save them a climb of some 40 ft from the mill floor to the locker room located at street level.

"The locker room, incidentally, provides an individual locker for each employee and is furnished with four groups of showers and

other facilities of the most modern type.

"The installation of the speedwalk was made possible by the new locker room, which consolidated at one place the previous locker room facilities at six locations scattered through the mill."

Previous installations of passenger conveyors in industry have been limited to particular operations. For instance, in automotive plants, workers "ride" a belt as it moves down an assembly line; foundrymen for years have poured castings from moving pouring walks synchronized to the speed of the mold conveyor. But the me-



TWO MOVING BELTS converge at first level at Weirton Steel Corp.'s four-unit human conveyor. It carries workers from mill floor to locker room three floors above. The installation is first of its kind in a metalworking plant; was built by Stephens-Adamson Mfg. Co.

chanical hauling of workers to locker rooms and to main gates is just starting to take hold.

In the metalworking industries, despite the many plants which move shift workers numbering hundreds through confined areas, Weirton's passenger conveyor appears to be the first. The unit was



THESE THREE Speedwalks at Weirton carry workers a height of 41.9 ft.

constructed by Stephens-Adamson around a Goodyear belt.

Link-Belt is another active producer in the passenger conveyor field and Hewitt-Robbins has installed a moving sidewalk in a West Virginia mine. B. F. Goodrich also is supplying belting.

In operation, a moving sidewalk is simply an endless belt sliding

over a steel bed or a series of closely-spaced rollers. It can move horizontally or up inclines to 15°.

Because of the lack of intricately jointed steps, the total installed cost can be 60 to 80 pct that of an escalator. You can figure the original cost of a moving sidewalk at \$150 to \$300 per ft, depending largely on whether a moving handrail is supplied.

Three Stages

The Weirton installation is powered by electric motors up to 15 hp, though most are smaller. An electric eye could be used to activate the unit, though as initially installed, it is equipped with push-buttons.

A worker going off the mill floor rises 16 ft 9 in. on the first unit to a second stage, steps onto the second belt and is carried to a point 12 ft 6 in. above. He then steps on a third belt and is moved up another 12 ft 6 in. to the locker room.

The angle is gentle enough, the motion slow enough that the maximum of safety, comfort and efficiency is provided, Stephens-Adamson engineers claim. The 13° grade was selected because it is convenient even for a front office secretary who tours the plant wearing high heels.

Steel side panels, topped with either a stationary or moving handrail, keep the overly-casual

rider who leans back to study the ceiling, from pitching over the side.

Because the Weirton sidewalk is planned primarily to relieve congestion for workmen going off shift, it is not reversible. But it is possible to install a single two-way belt in areas where heavy traffic may be moving in opposite directions at different times.

Stepping onto the moving belt from a stationary platform presents no problem as the belt is moving at one-half normal walking speed.

One expert, R. C. Sollenberger, executive vice president of the Conveyor Equipment Manufacturers Assn., points out that industry learned many years ago that a comparatively small but continuous flow of materials would deliver "astronomical" tonnages during a day's run.

"Industry is just now discovering that the principle of continuous flow can be applied to the movement of people with just as startling results," he states. "Conveyors for the sake of movement of workmen would seem economically sound in these days of portal-to-portal pay, for they will cut travel time to the job."

The Weirton installation and reports that conveyor manufacturers are getting more inquiries from industrial firms indicate that the breakthrough may have begun.

OIL COUNTRY: Is Capacity Adequate?

Petroleum executive points to lack of tubular products as handicap to drilling programs . . . World demand for U. S. oil soars as Middle East crisis threatens supply . . . Conversion admitted—By K. W. Bennett.

♦ IN THE WAKE of the Suez crisis, Britain last week began stepping up its purchases of U. S. petroleum and ordered a 10 pct cut in national oil consumption.

This week, U. S. oil men are casting uneasy glances at the sizzling Near East and pointing out an increasing gap between U. S. domestic supplies of petroleum and an increased consumer appetite for oil and its by-products that has surpassed the most optimistic long range forecasts and seems to be getting even hotter.

In the face of this growing demand, some oilmen are openly charging that lack of oil country goods is a serious bottleneck to increased drilling programs. Meanwhile, they are turning to conversion and to imports, which also threaten to dry up.

Imports Grow

In 1956, crude oil imports advanced 22.4 pct over 1955. In 1957 they are again expected to advance, conservatively, by 6.5 pct. Overall U. S. demand for petroleum and products is, again conservatively, figured for a 4 pct increase. This spells out a 9,265,000 barrel per day 1957 demand as against a crude oil production of 7,309,000 barrels per day, with imports supplying the difference.

Oil men point out that during 1956, the industry accumulated considerable stocks of some petroleum products. They don't think it is going to happen in 1957. And if there is a cutoff of Near East oil, there's nothing but a blue-sky limit on foreseeable petroleum demand.

To the suggestion, "Why don't we drill more wells, faster?" oil men point up steel supply as a basic problem, among others. Said H. W. Ladd, Standolind Oil & Gas Company, "During most of the

time since 1946, development and production operations have been handicapped and curtailed in various degrees by our inability to obtain required quantities of . . . tubular materials from normal sources of supply, which are the steel-pipe mills of domestic manufacturing concerns."

Conversion Necessary

It's been necessary, Mr. Ladd said, to resort to conversion tubing (now a relatively scant source of material for lack of rolling mill space), refinishing of plain-end pipe and tubes, reuse of used casing and tubing, substitution of line pipe and standard pipe for oil country tubing and casing where possible, and purchase of foreign steel goods (65,000 net tons in 1956, but a dwindling source as foreign oil operations step up).

Mr. Ladd, speaking from an oil industry point of view, before the American Petroleum Institute, found little hope in the future. He anticipates shipments of 2,260,000 tons of tubing and casing in 1956 as opposed to a 2,760,000 tons demand; for 1957, 2,835,000 ton shipments to meet an estimated 2,953,000 tons of demand; and foresees little hope of capacity catching up with demand before 1960.

Doing Their Best

Steel mills are straining to catch up: at least two electric weld mills, one large pipe mill, and some stretch mills will come on during 1957 and 1958; several more are in the talking stage subject to the kind of financing arrangements that can be worked out. But meantime oil consumption and therefore demand, has been moving up for an average annual increase of 5 pct per year.

And this is over a 20 year period, while pipe mill capacity in-

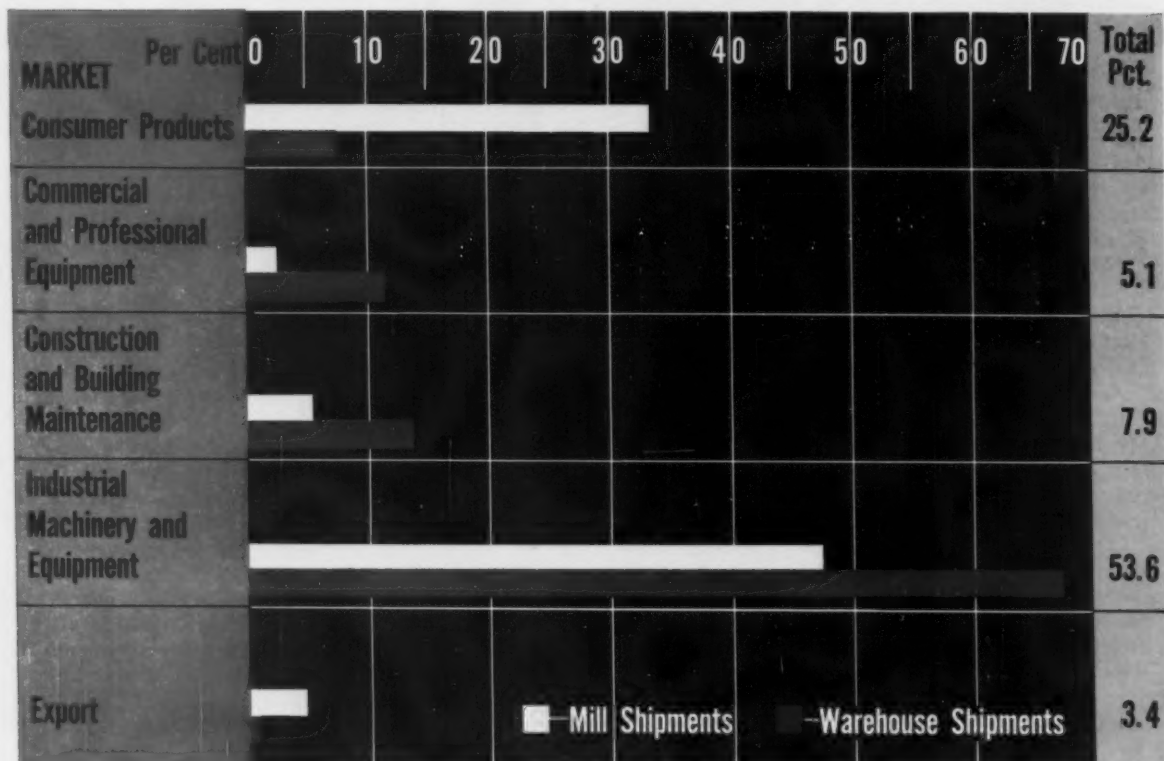
creases were negligible in the 1946-1953 period and oil demand moved steadily ahead. In 1955 oil well drilling was a \$3 billion business. Next year drilling should hit the \$3,228,000,000 mark, a sizable metalworking market target in anybody's language.

Increasing drilling costs have been cited as one factor that could discourage drilling. The remark holds little water. Cost figures prepared by Douglas Ragland, Humble Oil & Refining, suggest that as labor, materials, equipment, and services costs have advanced by 25 pct since 1950 advances in drilling technique have held completed well costs at about 1950 levels.

But the fact remains, the oil industry is on the way to an annual total of between 65,000 and 70,000 wells drilled per year by 1965.



Warehouse Survey Shows Where Stainless Goes



STAINLESS: Warehouse Sales Up 61 Pct

Survey shows almost one-third of stainless products sold through distributors . . . In two products, sheets and plates, they accounted for more than 50 pct of all sales . . . Market pattern now more defined.

◆ ALMOST ONE-THIRD of all stainless steel is presently sold through warehouses.

Warehouse distribution of stainless products, results of a joint survey reveal, has increased by more than 61 pct within the last decade. Information gained about these warehouse customers, the survey indicates, has substantially changed knowledge of the overall stainless distribution pattern.

The survey, sponsored jointly by the Committee of Stainless Steel Producers, American Iron and Steel Institute, and the American Steel Warehouse Assn., shows

that 31.4 pct of stainless went through warehouses in the first half of 1956, as opposed to only 19.5 pct of total production in 1946—a 61 pct gain.

An even more dramatic increase in warehouse percentages was discovered in two specific products—sheets and plates. During the first six months of '56 they sold 55.4 pct of all stainless steel plates and 57 pct of all sheets.

Users Spotlighted

The marketing picture for stainless products appears in a new perspective as a result of the survey. End uses are much more

ABOVE: Chart shows how overall stainless market pattern varies when warehouse distribution is averaged along with mill shipments.

diversified than previously available data, based on mill shipments, had indicated. Relative size of various markets for stainless was also more clearly delineated through added knowledge of warehouse distribution.

Makers of restaurant and commercial equipment, for example, are revealed as purchasing three times as much stainless as pre-

viously believed. While mill shipments to them were a little over 4500 net tons, addition of warehouse purchases brought the complete total up to more than 13,500 net tons.

Similarly, construction and building maintenance uses for stainless steel are larger than thought. Warehouse figures increase the known total for these uses by almost 70 pct.

Another more important customer for stainless was aircraft where above one-third of the industry's total requirements during the first six months in '56 were warehouse derived.

Auto Market

However, automotive industry and other mass production consumer products manufacturers were indicated to be largely mill customers. Their apparent uses, as shown by the survey, dropped from 33.3 pct to 25.2 pct of total stainless steel sold by mills and warehouses combined.

Overall known volume of all industry applications for stainless has been substantially increased through study of the survey results. They indicate that 67.2 pct of warehouse volume was much larger than mill shipments for such end uses as chemical equipment, pulp, paper and textile machinery, food and beverage equipment, and fasteners.

Will Aid Marketing

By providing producers and distributors of stainless steel with more complete knowledge of their markets, the survey is expected to aid in marketing and facilities planning. Through analyzing its results, it is hoped each company can evaluate its strengths and weaknesses in specific areas. More effective cooperative promotional activities are now more feasible, survey sponsors indicate. They also see a more solid basis now existing for projecting the need for increased production facilities to keep pace with growing markets.

Another use for the survey, they point out, is in forecasting stainless sales for 1957 and even longer periods more accurately

since the revealed market pattern is expected to hold for the foreseeable future.

Final report of the survey and comparisons of mill and warehouse shipments were prepared by the Commercial Research Subcommittee on Stainless Steel. It consisted of Chairman R. L. Harding, Jr. of Allegheny Ludlum Steel Corp.; J. T. Anderson, Armco Steel Corp.; L. J. McDevitt, Crucible Steel Co. of America; R. G. Harrison, Republic Steel Corp.; and G. S. Miner, U. S. Steel Corp.

Filling A Need

Warehouses—filling requests for many types and quantities of stainless products required by many different small users—average 649.9 lb per order.

Percentages of their total orders on a per lb basis are as follows:

Lb	Percentage of orders
1-9	12%
10-99	37%
100-999	37.4%
1,000-9,999	12.6%
10,000-99,999	.9%
Over 100,000	

Steel Bars:

U. S. Steel Supply adopts wrapping for identification.

♦ STEEL BARS look pretty much alike to a machinist's apprentice. The effort to make different alloys actually look different has become a major problem, particularly in the warehouse industry.

Last spring (THE IRON AGE, May 19, 1956) Joseph T. Ryerson & Son wound up several years of study with a tri-color coding system for steel marking that was greeted as a major advance. This week, U. S. Steel Supply Company is shipping cold finished steel bars, wrapped for identification. This is generally considered another major blow at the identification problem, though from a considerably different tack.

U. S. Steel Supply will continue to use its basic two color marking

system. Steel strap packaging supplied by Gerrard Steel Strapping Division, with the seal of the packaging strap marked with the carbon content of the steel in question, will augment this.

Not Confined

Most codes identify steels within a carbon range. It's U. S. Steel Supply's contention that the "grade marking" system pinpoints the steel analysis exactly. It seems likely that the stamped seal will carry more information in the future, since current thinking suggests wrap-marking of alloy and stainless steels and aluminum as well.

It seems likely that the "grade marking" system of product identification will not be confined to bars. Flat rolled stainless, cold rolled sheet and strip, hot rolled carbon bar, and very probably tubular goods might well be included in the ultimate list.

At present, U. S. Steel Supply stamps a portion of the seals used, while Gerrard supplies seals already stamped and lithographed for products which normally sell in heavy tonnages.

In answer to the argument that once the bundle is broken, the steel strap with its identifying seal could be lost, U. S. Supply spokesmen point out that, in any event, the bar ends would still be color coded in the past.

Small Too

Packages need not be large. Bundles can be delivered stamped in the grade marking manner in packages no more than 3 in. in diameter. For these small orders, wire may be used rather than the conventional 3/4-in. strapping, in which case the marked seal is affixed to the wire.

The color coding system will continue to designate the surface condition of the bar stock, or its treated condition if it has been heat-treated for special properties.

Simplified markings for small orders of steel are a direct answer to a problem that has had shopmen gnawing their nails and losing production time for years. What's more, it's not bad business for the supplier.

CONGRESS: What's Ahead for Business?

The new Congress is expected to follow closely the pattern set this year . . . Few laws antagonistic to business are foreseen . . . Ike's influence with congressional leaders a big factor—By G. H. Baker.

♦ **BUSINESSMEN** CAN confidently expect to get a fair shake from President Eisenhower and from the new Congress in 1957. The legislative outlook, as far as industrial management officials and businessmen generally are concerned, is for a Senate and House that will operate very close to the legislative pattern set by the now-expiring Congress.

There'll be few, if any, new laws written next year that will be either antagonistic to businessmen or slanted in favor of businessmen.

Modernization again will be the keynote in Washington.

On the whole, the government

for next two years will be fairly conservative, with Southern Democrats in the driver's seat in Congress. From the businessman's point of view (the less government the better) a situation where the Congress and the White House are of different parties can be desirable—it installs another check-and-balance into government; tends to block extreme actions, and slow the growth of bigger and bigger government.

Ike's persuasiveness with congressional leaders of both parties will go far in helping to achieve the 1957 legislative program now being drafted at the White House. President Eisenhower got most of

what he wanted during the past two years, and there is every reason to believe that he will continue to do so.

On important issues of interest to businessmen, here's the outlook:

DEFENSE SPENDING: Rising cost of materials and new types of weapons will send the defense budget up, probably by \$1.5 or \$2 billion, bringing the total to about \$38 billion.

TAXES: Don't expect any major tax-cutting in 1957. There is a chance for bipartisan support for a tax cut for small firms, but virtually no possibility that the corporation rate will be permitted to drop to 47 pct; very little chance of any across-the-board excise tax reductions, and only a slim chance for a personal tax cut.

INFLATION: Money will remain both tight and "hard." The Administration probably will not ease its efforts to hold prices down as much as possible, although Democrats in Congress will make lots of noise about hard money "wrecking the country."

TAFT-HARTLEY ACT REVISIONS: Some minor changes may be made, but the check and balance between the White House and Congress will probably block major amendments.

BUSINESS PROBES: These will continue, probably at a stepped up pace, as the Democrats will try to show that businessmen are hurting labor. Probes of businessmen who serve as unpaid consultants (WOC'S) will probably increase.

LOBBYING: Efforts to tighten up the lobby registration laws and add new controls over lobbying—including regulations concerning contacting of officials of the ex-



Outlook for Major Legislation

The New Congress Will Talk About	And Will Finally Vote		
	YES	NO	POSSIBLE
Taft-Hartley Revision		X	
Corporate Tax Cuts		X	
Personal Tax Cuts			X
Small Business Tax Cuts			X
Excise Tax Reduction		X	
Small Business Aids	X		
Technical Excise Corrections	X		
Hoover Commission Proposals	X		
Natural Gas Bill			X
Tighter Lobby Law			X
Welfare Fund Controls			X
Extend Small Business Loans	X		

ecutive agencies as well as Congress, will probably be successful.

FOREIGN: Foreign aid spending will remain about at present levels, but efforts to increase foreign trade will be stepped up. Restrictions over U. S. and allied trade with the Reds will not be loosened.

SMALL BUSINESS: A host of actions to aid small business, from easing inheritance stock registration, and depreciation laws to removing obstructions in the excise tax laws and extending the life of Small Business Administration.

HOOVER COMMISSION: Legislation to carry out recommendations of the Commission to cut waste and speed efficiency of government will continue to move slowly.

Contracts:

Senators say small firms aren't getting their share.

Indications that small business is not getting its share of government military contracts was termed "seriously disturbing" by the Senate Small Business Committee.

In a report emphasizing lopsided distribution of defense work, the Committee noted that in the fiscal year 1956, small business received only 19.6 pct of the dollars spent by the Dept. of Defense, while in 1954 the share was 25.3 pct.

In contrast, from January through June, 1955, the 100 largest military prime contractors got 68.4 pct, compared to 63.5 pct from July, 1950 through June, 1953.

At the same time, the Committee commended federal civilian agencies for placing 49.1 pct of their prime contract dollars with small business. The Committee recommended that:

1. Studies be made of civilian agencies' contract-awarding techniques with a view toward adapting them to the Defense Dept.
2. Efforts be made to increase small business' share of research and development contracts.
3. Statements of contractors claiming to be small concerns should be verified.
4. All procurement agencies encourage major prime contractors to advertise widely.

BUSINESS

LIVING COSTS: Up Or Down?

In terms of hourly labor they've dipped since 1951, according to a NICB survey . . . Of 16 key items checked 12 are lower, two the same and two are higher.

	AUGUST, 1951		AUGUST, 1956		PCT. CHANGE AUGUST 51— AUGUST 56	Pct. Increase
	Hours	Minutes	Hours	Minutes		
10 lb. Potatoes	19	M	26	M		36
Men's Haircut	40	M	43	M		7
1 lb. Bread	6	M	6	M		0
Gasoline	9	M	9	M		0
Movies	25	M	24	M		4
Doctor Visit	2 H	16 M	2 H	10 M		4
1 lb. Coffee	33	M	31	M		5
1 qt. Milk	8	M	7	M		12
House Dress	2 H	1 M	1 H	41 M		16
Refrigerator	149 H	53 M	117 H	31 M		22
Men's Shoes	6 H	29 M	4 H	58 M		23
1 lb. Bacon	26	M	19	M		27
Men's Suit	33 H	44 M	24 H	38 M		27
Round Steak	41	M	28	M		33
1 Doz. Eggs	30	M	19	M		36
Nylon Stockings	47	M	27	M		42

♦ **THE AVERAGE U. S. production worker** doesn't have to work as long as he did five years ago to buy most key consumer items, the National Industrial Conference Board reports.

In August, 1956, 12 out of 16 goods and services cost less in terms of hours of labor than they did in August, 1951. Declines in worktime range from 4 pct for a movie admission to 24 pct for a pair of nylon stockings.

A worker had to work 30 min to buy a dozen eggs in 1951, but

only 19 min in 1956; a lb of bacon down from 26 to 19 min; a lb of coffee down from 33 to 31 min; a man's suit, down from 33 hr and 44 min to 24 hr and 38 min.

A visit to the doctor's office requires slightly less worktime—2 hr and 10 min now compared with 2 hr and 16 min in 1951.

Of the 16 items checked by NICB, only two showed increases. To buy a 10 lb sack of potatoes in 1951 required 19 minutes work. Now it requires 26 min. A man's haircut is up from 40 to 43 min.

FINISHING: Abrasives Star

Precision grinding and finishing on all sizes of work with abrasive belts demonstrated . . . Some units handle flat stock up to 4 ft or more in width.

♦ **AMPLE PROOF** of the abrasive coated belt's grinding and finishing versatility and efficiency in handling everything from metal stock 4 ft wide down to tiny jet turbine blades was demonstrated at the Second National Metalfinishing Show.

A demonstration of a 50-in. wide belt surfacer developed by Engelberg-Huller Co. for the precision sizing and finishing of flat stock up to 4 ft. wide, 2 in. thick and any length long, drew particular attention. Belts up to 86 in. wide and more than 10 ft long have been developed, it was pointed out, for grinding and polishing sheet, plate, bar, coil and blanked shapes.

Another exhibitor—Stephen Bader & Co.—featured the exacting work of polishing turbine blades for jet engines. Work was performed on a new jet blade polishing head.

In all, nearly 100 machine tools and metalworking machines, most of them developed within the past

two years, were displayed at the Cleveland exhibit.

Purpose of the show, sponsored by the Behr-Manning Co. of Troy, N. Y., div. of Norton Co., was to demonstrate significant new techniques in the coated abrasive grinding and finishing of metals. Aim was to provide a clearing house of information and education on the new developments in this expanding technology.

During the show many industrial production men attending brought actual workpieces for comparative testing on new equipment. Units used for the tests ranged from huge automatic machines destined for automobile and appliance production lines to small specialty tools.

Features of the show—held at Behr-Manning's clinic rooms—included lecture-demonstrations by the firm's scientists and engineers and showing of a new color film on the uses of abrasive disks.

About 3000 production men attended the show.



AIR-POWERED vertical sander, revolving a 9-in. coated abrasive disk, polishes draw marks from a drawn steel tub. Unit is a product of the Rotor Tool Co., Cleveland, an exhibitor at Metalfinishing Show.

Fasteners:

Using fewer sizes and types can cut inventory costs.

Practical tips on how to cut inventory and stock handling costs by using fewer sizes and types of nuts and bolts are offered by a large supplier.

The firm—Russell, Burdsall & Ward Bolt and Nut Co.—also points out that such simplification need not affect quality. They cite the experience of an electrical manufacturer who found it no handicap to eliminate all bolt sizes in sixteenths in bolts larger than $\frac{3}{8}$ in. An engineering firm is mentioned as eliminating 1700 different items from its inventory by setting up standards for joint designs.

Here are the suggestions RB&W passes along:

1. Remember it's seldom necessary to stock special alloy bolts and cap screws. Three types of steel fasteners—machine bolts, bright cap screws, and high strength bolts, can do almost all joining jobs.

2. Forget thread fits for all but specialized jobs—such as studs for tapped holes. Standard tolerance fit will usually provide as strong a joint at lower cost.

3. Use only coarse thread fasteners except for positioning screws where fine adjustment is an absolute necessity.

4. Save money, when possible, by changing diameter or length rather than by adding another item to stock.

5. Stick with hex head bolts.

6. Don't forget that heavy nuts belong with larger bolts, finished nuts with smaller. You can save by stocking only heavy nuts for large bolts.

Unique Ground Breaking

Temco Aircraft Corp., Dallas, Tex., has broken ground for a new million dollar engineering center adjacent to its plant at Garland, Tex.

Building is scheduled for completion in July 1957, and will then serve as the headquarters for over 900 engineers.

Flood Aid:

U. S. insurance plan slowed by indemnity problems.

Industrial companies wishing to reduce the severe financial losses that may result when plants are swept by floods or high tides will have to wait at least two months more before they can buy government-backed flood insurance.

Authority for offering up to \$5 billion in coverage has existed since last Aug. 7, when President Eisenhower signed the Federal Flood Insurance Act of 1956. Responsibility for setting up a system of indemnification was placed with the Housing and Home Finance Agency, which created a new branch to handle the work.

Nothing Firm

Even before the formation of that branch, the Federal Flood Indemnity Administration, an HHFA group was attempting to get a line on rates and costs of the experimental program. But neither rates nor commissions have been decided on, and there is yet no firm estimate on costs of this plan to the government.

Frank J. Meistrell, chief of the flood indemnity branch, indicates that despite the lack of solutions to these particular problems he is encouraged by the work that's been done. Policies can be made available by commercial insurers early in 1957, he expects.

Planning Problem

Maximum coverage for a company or an individual, as prescribed in the law, is to be \$250,000, and top coverage for a home will be \$10,000. Within these limitations, however, the government finds it has some complex questions to settle regarding operations partially owned and partially leased.

Here is an example confronting the planners: If one man owns a factory, but merely leases the machinery in it, can both he and the owner of the machinery get the new insurance? It seems possible to the government that the answer may be "yes," but there is as yet no final answer on this.

MAINTENANCE

WINTER: Time To Get Ready

Cold weather can result in costly damage to your plant unless adequate precautions are taken . . . Snow, freezing pipes and other problems can be met in advance of winter.

◆ NOW IS the time to get your plant ready for the winter. The main enemies of industry during the upcoming months will be snow, ice and extreme cold. Not taking proper precautions against these can be costly in terms of disrupted production and damage to valuable machinery.

The problem of snow clearance is perhaps the easiest to solve. Larger companies with maintenance manpower usually purchase their own specialized equipment. Bethlehem Steel Co. has belt-type traveling snow loaders and special broom equipment which is hooked up on locomotives for keeping yard tracks clear.

Smaller companies with less imposing requirements can purchase pushing blades which attach to fork lift trucks and industrial vehicles. Some companies, both large and small, consider it most economical to hire roadbuilding contractors.

Ounce of Prevention

Buying equipment or hiring a contractor is a good ounce of prevention. But don't forget the pound of cure. Snow usually drifts. Temporary sidings should be available for open end buildings. Snow is also deceptively heavy and should be removed from roofs. It has been known to cave in roofs with heavy damage to the building and equipment.

Ice and cold can be more difficult opponents. Both must be prepared for before winter or costly damage is sure to occur. Despite modern technological advances, the most widely used methods for keeping pipes from freezing up are (1) 50 gal drums or salamanders of coke or some slow burning fuel placed at key locations close

to pipes, and (2) packing animal manure around exposed water lines, such as at valve pits.

Utilize Steam

Plants which use steam in their operations may be able to divert some lines to run next to water or fuel lines.

Steam can also be used to thaw out raw materials which must be stored in the open. Major steel companies thaw out their ore in this manner.

Do you know all the materials in your plant which must be protected from freezing up? For instance, sprinkler systems should be emptied at the first sign of freezing weather. This is considered as approved procedure by fire underwriters since use of a master valve will refill the system in the case of necessity in a matter of minutes.

And adhesives manufacturers report that some forms of adhesives, such as Latex, will freeze up in cold weather unless properly protected.

Safety Factor

After all necessary preparations have been taken to assure continued production during the winter, it is wise to consider the problem from the standpoint of employee safety. Beware of falling icicles, for example. When accessible on low roofs they should be immediately broken off. Forming along roofs too high to reach should result in roping off of the area, or at least warning signs. Bethlehem Steel goes even further in installing electric or steam heaters under roof eaves and protecting building entrances which cannot be roped off with small canopies.

GEARS: Synchronized For A Record Year

Outlook for the power transmission industry is rosiest in its history ... Capital expansion programs and military orders call for smaller, tougher gearing ... Backlogs assure high output well into 1957.

◆ **TREMENDOUS STRIDES** in gearmaking technology are paving the way for the power transmission industry's biggest year.

The nation's gear manufacturers, spurred by demands from makers of computers, radar, guided missiles and jet aircraft, are producing in quantity gears not known to be obtainable 10 years ago.

In high production gearmaking for the automotive industry, use of automatic machinery is increasing. Blanks fed into new hobbing machines are worked to size, heat treated, and inspected without touching a human hand.

In aircraft work, the trend is toward hardened and ground

gears. Advances in tool design, grinding technique, and heat treating permit machining of metal without disturbing grain structure, burning, or cracking—common causes for gear failure in the past. Finishes of from 3 to 5 microinches can be had when needed.

More customers this year are asking for smaller, lighter, stronger, harder gears—and they are getting them. It adds up to an estimated \$948 million year for the power transmission industry. And order backlogs will carry record shipments well into the second quarter of 1957.

Prior to 1956, the industry's best year was 1951, when Korean War orders swelled shipments to \$854 million, 10 pct lower than

this year's estimate. The U. S. Census of Manufactures shows shipments in 1954 were \$598.8 million and in 1947 they totaled \$428.9 million.

New Processes

Accompanying this increased dollar volume was an influx of 54 new companies into the industry during the period 1947-1954. At last count, there were 470 companies engaged in power transmission equipment manufacture.

But automatic equipment installations accounted for a 9 pct drop in total employment during the same period. There were 54,000 workers in 1947, compared to 49,300 in 1954.

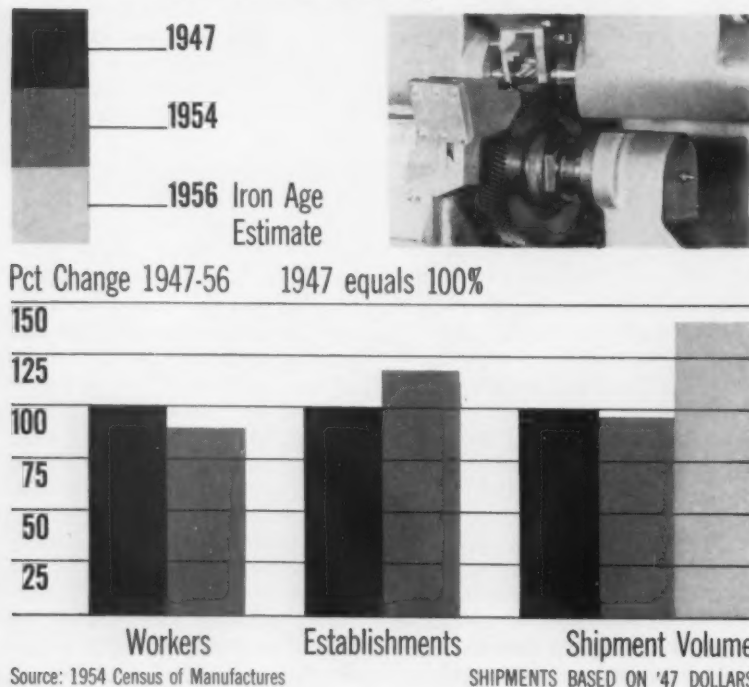
A lot of progress is being made in speeding up gear hobbing and shaping processes. However, the latest trend is toward displacement of metal rather than removal. Research is intensive, and it is not unlikely that in the near future gear rolling machines will start replacing gear hobbers in large numbers.

Quieter gears are another coming field, as companies become more conscious of noise problems. By redesigning housings, bearings, and through closer fitting, gear wobble and eccentricity are being reduced.

A whole new market is being created by shaft-mounted reducer manufacturers. They are finding ready buyers for their package unit prime movers and reducers which are quieter and more versatile than conventional models.

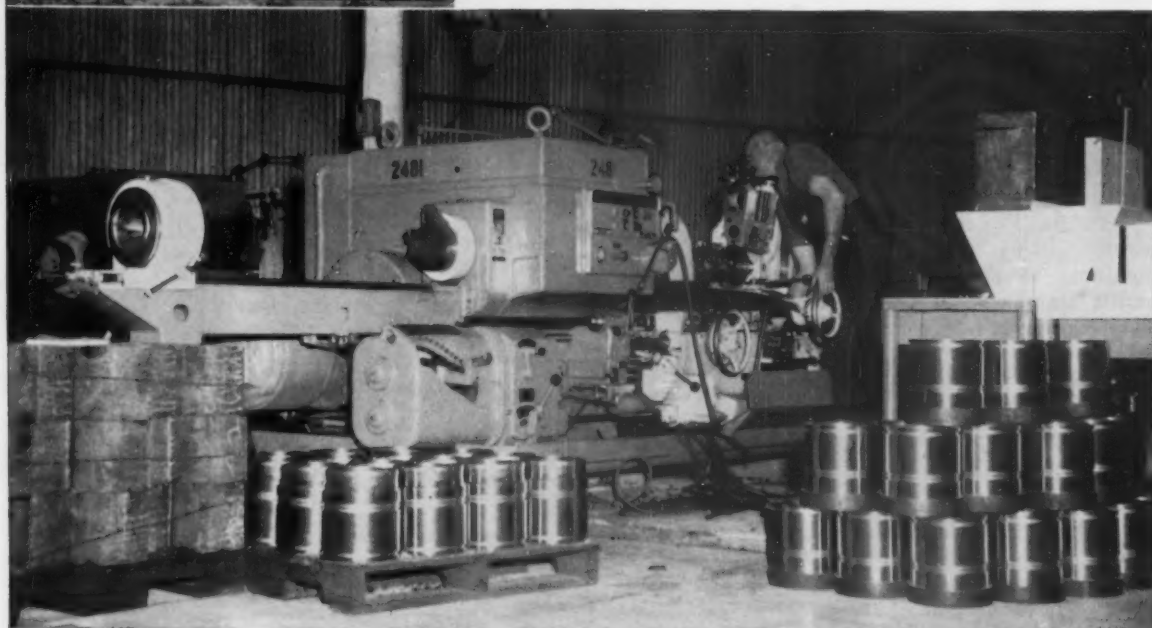
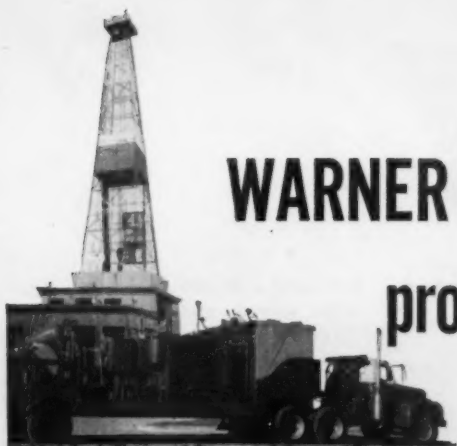
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Power Transmission Industry Pulls Ahead



WARNER & SWASEY TURRET LATHES

produce results at Halliburton



Warner & Swasey 3-A Universal Extra-Heavy Duty Turret Lathe machining closing sleeves for 8 3/4" D. V. Multiple Stage Cementer, made from alloy steel tubing. Tolerances: .002 to .003. These and many parts for Halliburton's Twin T-10 Cementing-Fracturing 10-boy trailer unit, shown above, are machined on Warner & Swaseys.

HALLIBURTON Oil Well Cementing Company, the world's largest service company to the oil drilling industry, is one company whose particular turning requirements put the highest premium on turret lathe flexibility. That's why they depend on standard-tooled Warner & Swaseys.

In the Halliburton plant at Duncan, Oklahoma, the flexibility of their more than 20 Warner & Swasey turret lathes has been proven out time and again. Sudden demands from their field units—often on an emergency basis—plus frequent design changes for their equipment, put the flexibility of these turret lathes and their standard tooling to a real test. The Warner & Swaseys have met these demands—

turning out the variety of small lots, holding required close tolerances and finishes, and producing at low cost with the very minimum of downtime.

It is significant that the growth of this company has been paralleled by ever-increasing numbers of Warner & Swasey turret lathes in the Halliburton plant. Since the first installation in 1934, they have looked to Warner & Swasey to meet their peculiar turning requirements. An important part of this long-standing business relationship is the prompt service and sound tooling advice provided by their Warner & Swasey Field Representative—service that is available nation-wide.

Filling the specialized turning requirements of machine tool users—

plus the more usual machine shop applications—is our job. Our nearest Field Representative will be glad to work with you to fill your needs. He'll recommend the right machine, with proper tooling, to most efficiently handle your work. Call him in!

**WARNER
&
SWASEY**

Cleveland

PRECISION
MACHINERY
SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

November 15, 1956

101

Westinghouse:

Building new plant for switchgear distribution apparatus.

Westinghouse Electric Corp., has begun construction of a new plant for production of its switchgear distribution apparatus, at Bloomington, Ind. F. H. McGraw and Co., Chicago has been awarded the contract.

Work is scheduled for completion sometime in the fourth quarter 1957.

Products to be turned out at the new installation include capacitors, lightning arresters for electric utility transmission systems, cut-outs, and oil type reclosers for use on medium voltage distribution systems.

It is estimated by the company that when full production is reached the plant will employ about 450 persons.

During construction R. G. Edsall will be works engineer, with headquarters at the plant site, to act as Westinghouse representative responsible for general supervision of the construction.

Upon completion of the project F. F. Herman will take over as manager of the new plant.

\$2.5 Million Project

The Aro Equipment Corp., Bryan, O., will spend \$2.5 million to enlarge its manufacturing capacity. Part of the project will be the decentralization of the aircraft, air tool and lubricating equipment divisions.

The factory and offices will be enlarged by about 60,000 sq ft over the next five years.

Initial plan calls for the addition of 9600 sq ft to the East End plant, Bryan, for the production of liquid oxygen converters and components.

Program also calls for the addition of new products to the company's line in 1957.

Carbide Design Center

A multi-million dollar engineering building will be built by Carbide and Carbon Chemical Corp., a div. of Union Carbide and Carbon Corp., at South Charleston, W. Va.

The proposed five-story structure will house more than 500 engineers engaged in designing new equipment and new plants for the company's expansion program.

An X-shaped building, it will occupy ground adjacent to Carbide's research facilities and not far from a proposed development laboratory site. Construction of both projects is scheduled for completion during the first quarter of 1958.

New Croname Plant

Croname, Inc., Chicago, manufacturers of nameplates and decorative metal parts is building a new plant at Niles, a suburb of Chicago, expected to increase manufacturing facilities by 50 pct.

A 277,000 sq ft, one story factory

will join a 30,000 sq ft, two story office section and a 10,000 sq ft cafeteria.

More Titanium Dioxide

National Lead Co., New York, will expand its St. Louis titanium pigment plant to add 25,000 tons of titanium dioxide to its annual capacity.

This will make a total capacity at St. Louis of about 83,000 tons.

Brass Mill for Frisco

Plans for a \$2.5 million brass mill in the San Francisco Bay area have been completed by Titan Manufacturing Co., Bellefonte, Pa.

The new mill will be erected at Newark, Calif., on a 40-acre site purchased from the Southern Pacific Co., according to W. W. Sieg, Titan president. He claimed it will be the only brass mill in the Bay area.

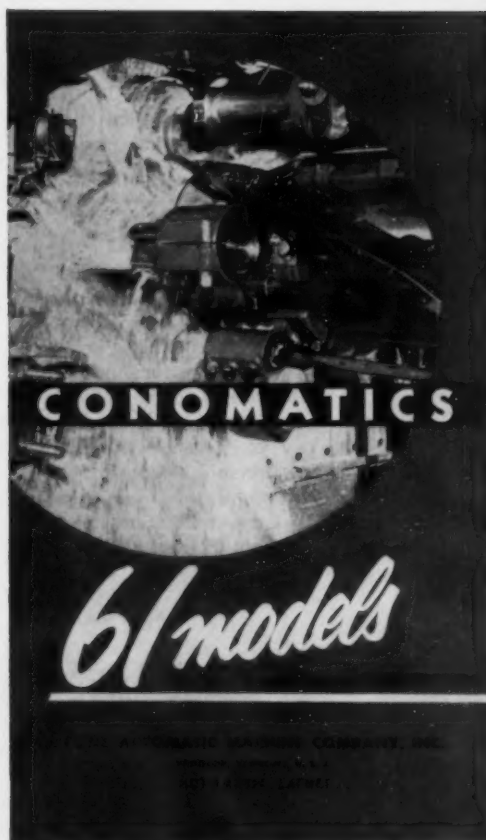
The plant will cover about 85,000 sq ft and will produce brass rod and forgings. Rosendahl Corp., San Francisco, is general contractor.

Unorthodox Beam Speeds Construction

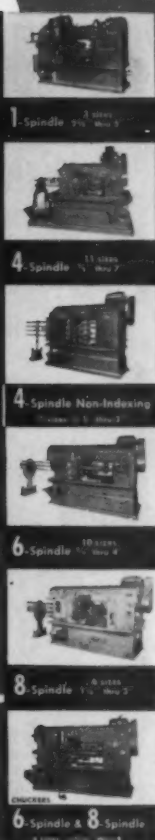


◆ STEEL COLUMN with the unusual shape is typical of the type used in the new Inland Steel Co. office building in Chicago. Slightly unorthodox appearance is due to the fact that the columns were fabricated from plate and angle steel. This technique allowed Inland to go ahead with its new building despite the tight situation in structurals.

The metal was supplied by Joseph T. Ryerson & Son, Inc. The plate was flame cut to size in the Ryerson shop and joined by welding. Despite the fact that the plate ranged up to 3 in. thick for the lower tiers the columns were produced in near record time through the use of high speed automatic welding equipment. Inland reports about 5000 tons of steel were used.



61 models



A machine not put to its best use is theoretically idle. Proper machine selection is an important factor in the profitable use of a multiple spindle automatic. So extensive are the demands on this type of lathe that no single model—or number of models—can be expected to efficiently handle the wide range of work available.

To excel in any range of work a multiple spindle automatic must be specifically designed for that range. That is why CONOMATICS are provided in so many models. In no other way can the purchaser be assured of the best possible machine for his particular requirements.

Write for your copy Today



Conomatic

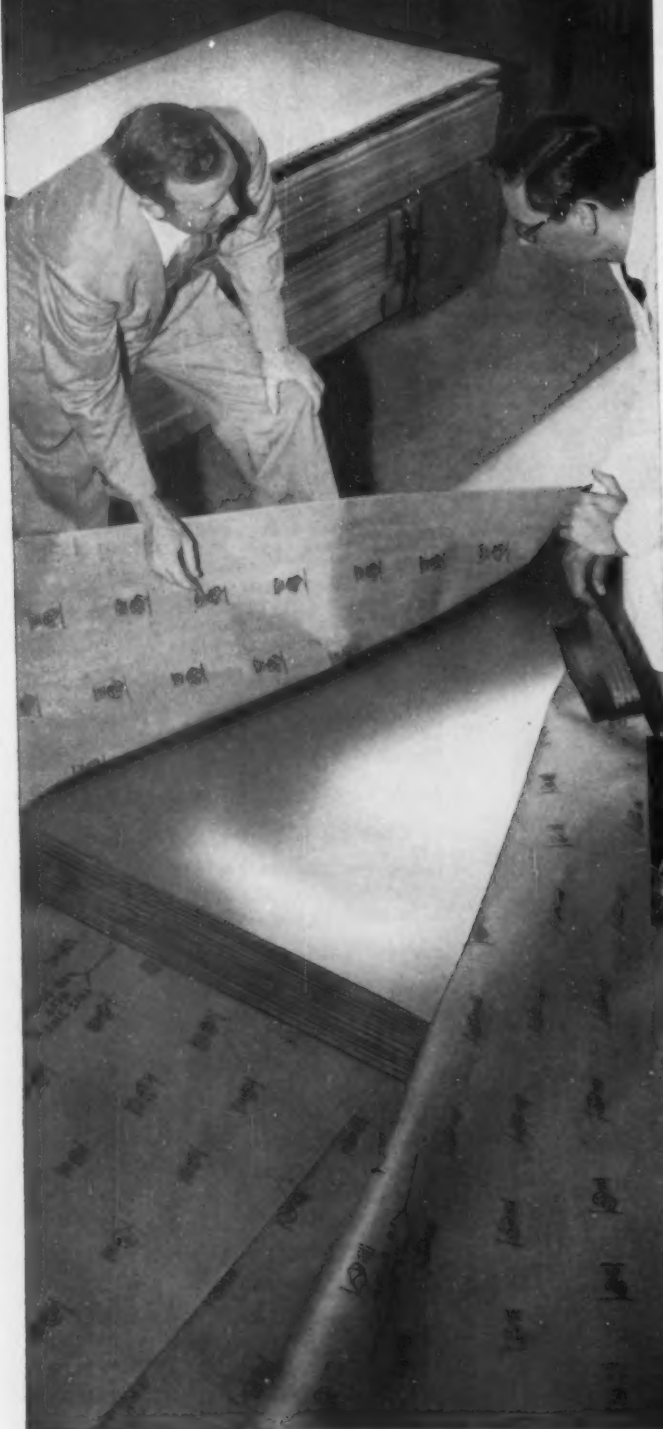
CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U. S. A.

how to rustproof steel in warehousing

When unusual times and conditions make it necessary for you to warehouse any kind of steel, even such sensitive steels as black plate and cold rolled, here's how you can combat the rust problem. Wrap your steel in Ferro-Pak, Cromwell's volatile corrosion inhibitor paper. Non-toxic chemical vapors from Ferro-Pak coat the steel with an invisible film that makes it impossible for rust to get the slightest foothold.

Even under adverse conditions, such as outside storing or shipping, Ferro-Pak provides complete protection. It is waterproof, strong, yet highly flexible and easy to handle. The chemical rust inhibitor is compatible with oil and stays effective for long periods even when the humidity soars.

Whether you're a shipper or a buyer of steel, it will pay you to specify Ferro-Pak wrapping wherever rust is a problem. For an interesting idea brochure on many uses for Ferro-Pak, write Cromwell Paper Company, 4803 South Whipple Street, Chicago 32, Illinois.



How to rustproof a freight car—Ferro-Pak is used to line sides of car and to interleave cells, transforming ordinary freight car into huge rustproof package.



How to rustproof black plate—On this light gauge, dry, uncoated steel, rust can start from a fingerprint. Ferro-Pak keeps black plate rust-free even when the humidity soars!

FERRO-PAK®

by Cromwell

For over 38 years—
"Paper Engineers" for Steel

REPORT TO MANAGEMENT

The Winners—The Bond Issues

When you stepped behind the curtain of your voting booth last week, you probably were faced with a bond issue or two, of varying magnitudes depending on size of the project.

And if you were like 95 pct of the voters, you probably voted for your own local issue, thought little about it other than the prospect of a possible increase in your local taxes.

But when added up, voters across the nation approved borrowing of \$2.3 billion to finance public projects of one type or another, mostly public works such as highways or schools. This total represents 95 pct of the \$2.7 billion issues that were up for approval.

What Does It Mean to You?

First, it means that there will be continued heavy outlays for public construction; highways, schools and public buildings. And the near unanimous approval indicates the continued need for growth of public facilities.

It also means that much more strain on the already tight money market, which has already been pushed to the limit on bond issues. It's a safe bet that some of the issues will never be sold—either because of failure to attract bids, or because interest rates may be too high.

Not all of the issues were directly for public facilities or building. In a number of cases, the issues were to assist veterans to purchase new homes or farms. This should provide some aid to the sagging new home market. Note: A \$100 million issue to finance middle-income housing in New York state was defeated.

Interstate Highways Move Along

After a few months for its complex workings to get in motion, work on the vast highway

program passed earlier this year is finally gaining momentum.

This is indicated by the number of contracts awarded and bidding on projects since the Federal-Aid Highway Act was signed by President Eisenhower June 29.

During that period, according to John A. Volpe, Federal Highway Administrator, 31 states have contracted for 107 projects.

These projects involve work on 276 miles for a total estimated cost of \$100 million, of which \$74 million is in Federal funds. These have already been contracted for.

Plans have been approved with bids authorized for 40 additional projects to cost \$120 million. Ohio, New York, California and Texas are most active.

Tough Going for Hoover Commission

Some progress has been made in obtaining adoption of Hoover Commission recommendations for streamlining the government.

But the 35 to 40 pct of its recommendations that have been put into effect to date are the non-controversial ones, most of which did not require legislation.

Among the most controversial recommendations are those dealing with water resources and power, curtailment of veterans programs, reduction in government lending agencies, and reduction in government health and welfare activities.

In these areas, chances of favorable action received a serious setback by the results of the Congressional elections, which continued Democratic majorities in both houses.

But the commission, now operating as a volunteer organization, is already at work preparing groundwork for action in the next session.

INDUSTRIAL BRIEFS

Hits the Road . . . The Lima Works of Baldwin-Lima-Hamilton Corp., Lima, O., has gone into production on a newly-developed unit augmenting its line of road-building equipment. Trade named "Lima Roadpacker," the new unit is designed as a compacting tool to prepare bases for road paving.

The Heat's On . . . Loftus Engineering Corp., Pittsburgh, recently established a Heat Treating Furnace and Oven Division in Chicago. The Pittsburgh division is now devoting itself exclusively to the designing and building of steel mill equipment and induction furnaces, and at present is operating with a backlog of orders in excess of \$20 million.

Weather or Not . . . To test the effects of outdoor exposure to metal targets coated with various polyethylene and polyethylene blends, a unique weather testing station has been established by the American Agile Corp., Maple Heights (Cleveland), O.

Checking Course Charter . . . Servo Corp. of America, New York, has been awarded a contract totaling \$64,736 for the development of a dead reckoning tracer test unit by the U. S. Navy BuAer. The amplifier test unit will be destined to check accuracy and response time of any automatic dead reckoning navigation system.

All That Glitters . . . An economical method of applying 22 carat gold coatings on ceramics, porcelain enamel and stainless steel has been developed by the Hanovia Chemical & Manufacturing Co., East Newark, N. J. The heat treatment method is expected to put products with a genuine gold finish within reach of the middle income consumer.

Retires After 20 Years



Tell Berna

Tell Berna, executive vice president of National Machine Tool Builders Assn. and veteran of 20 years service with the Assn., will retire on February 1, 1957. He was honored at the recent meeting by a special dinner attended by the board of directors and past presidents, and was presented with a sterling silver tray, appropriately inscribed.

Millions for Missiles . . . The Navy has awarded two contracts for the production of guidance and controls units for its new air-to-air guided missile Sidewinder. The contracts, approximately \$14 million and \$17 million, respectively, were awarded to the Philco Corp., Philadelphia, and the General Electric Co., Utica, N. Y., respectively.

Venture In Israel . . . Adamas Carbide Corp., Kenilworth, N. J., has signed a contract to provide Iscar, Ltd., Nahariya, Israel, with equipment for the first tungsten carbide manufacturing facility in the entire Middle East.

Belle Lettres . . . According to the annual survey of "Financial World," a weekly publication, Copperweld Steel Co. was judged as having the best annual report of the small steel companies. The bronze "Oscar of Industry" was presented to the company at the annual awards banquet in New York.

High Honors . . . Recipient of the Gray Iron Founders Society's highest award this year, the Gold Medal, was Peter E. Rentschler, president, Hamilton Foundry and Machine Co., Hamilton, O. He was honored for leadership in progressive foundry management, especially in good housekeeping, safety, and industrial and public relations.

RECLAIM CHIPS



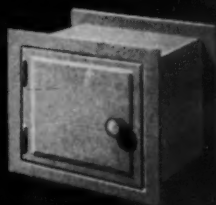
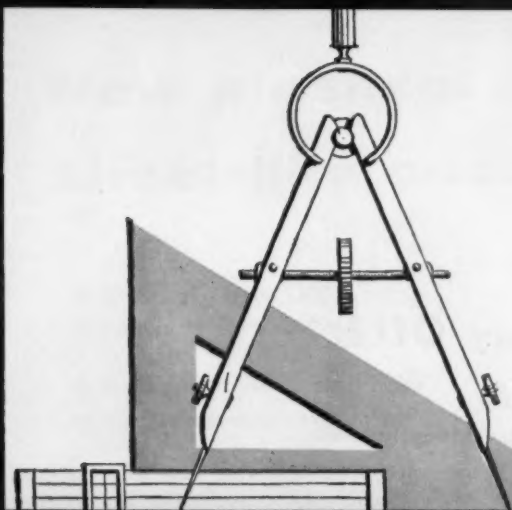
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Write for National's Free Bulletin C-56

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Fairview, Bergen County, N. J.
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and Pneumatic Systems for handling
granular materials

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advantages of
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galvanized steel
to work for you!



For appliances, for other steel products... when the job calls for galvanized steel, Weirkote does that job better.

Weirkote is made by a special continuous galvanizing process... and a tight zinc coating is applied.

Result: Weirkote is resistant to peeling, cracking and flaking, even under the severest stresses of fabrication. The coating stays uniform, flows evenly with the base metal, and holds fast under the deepest draws. Amazingly corrosion-resistant, too!

These are just a few of Weirkote's bonuses in durability, economy, customer satisfaction. Make it a point to investigate Weirkote from Weirton! Remember: In the long run, galvanized steel... in the LONGER run, WEIRKOTE.



WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

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AUTOMOTIVE ASSEMBLY LINE

Does Olds' Quality Control Pay Off?

The division's management thinks so . . . Lab and road tests are backed up by mass cross country runs in Arizona . . . Small percentage failures sought . . . Triple carburetor engine stands up—By T. L. Carry.

♦ IT IS GENERALLY conceded among industry observers that Oldsmobile Div. has one of the best quality control programs in the industry.

There are several reasons for this, among them modern manufacturing methods and good, sound engineering. The GM division also runs the usual number of laboratory and road tests on its products.

But the one thing that assures good quality more than anything else is the mass testing of first new model production cars before they are offered to the public.

Arizona Proving Ground . . . This year, Oldsmobile took 35 of its 1957 models out to the GM proving grounds in Phoenix, Ariz., and subjected them to rugged cross country tests. Olds has found that due to the climate and varied topographical conditions that Arizona is one of the best places in the country for a quality

control program.

A cross country trip over the Apache Trail near Phoenix, shows why the area is so well suited to road testing. The constant twisting and turning, and steep inclines and downgrades subject a car to just about every conceivable type of driving condition.

It was on the Apache Trail that Oldsmobile, in cooperation with General Motors Corp., first calibrated the shift pattern for the present Jetaway Hydra-Matic transmission.

J. F. Wolfram, Oldsmobile general manager, says that field tests in the area help the division to spot production bugs in a hurry.

Pleasability Engineering . . . When Olds tests its first production models it is looking for small percentage failures, that is, failures which will appear in only about 2 pct of the cars produced.

Olds feels that it sells its cars individually and a small percent-

age failure to the company is a 100 pct failure to the customer who buys the car.

The mass testing program aids what Olds calls "engineering for pleasability." It makes it possible for the division to produce a car that is balanced both in design and performance. The division does its best to make sure that every component part of the car works in harmony with the others.

The same tests are presently being applied to two new engine developments which are presently in the works at Oldsmobile.

The first is a unique application of 3 double barreled carburetors to an improved engine.

Two In Reserve . . . The multiple carburetors will be available as optional equipment after the first of the year. They will be installed on a 10 to 1 compression ratio engine which will develop a maximum of 300 hp.

At normal driving speeds only



LOAD TESTER hitched to rear of a 1957 Oldsmobile permits checking of engine load to almost any extent

desired. In background, speedometer test is made with fifth wheel. Note 95 mph speed limit sign.

New plastisol compound applies sheet-like coating through spray gun

◆ Unichrome "Super 5300" Coating announced by Metal & Thermit

◆ Durable, corrosion-resistant finish up to 60 mils thick achieved in one coat

Despite the molasses-like consistency of plastisol compounds, they can be *sprayed*. Several years ago, Metal & Thermit produced the first successful type which permitted 20-mil-thick films per spray coat. New "Super 5300" goes way beyond this—with 60 mils or more per coat.

"Super 5300" Coating gives a thick "sheet" of protection. But since it is sprayed, no seams or joints exist as with conventional sheet materials.

STRONG CORROSION PROTECTION

A compound based on vinyl resins, Unichrome "Super 5300" Coating shrugs off strong acids, caustics, water, salt solutions and other corrosives. Its tough, thick flexible film absorbs impact without chipping, deadens sound, withstands abrasion. Satiny smooth in appearance, it makes an attractive as well as unusually durable finish. It can often permit ordinary metals to be used in place of costly alloys.

"Super 5300" can be used most profitably to line tanks, ducts, pipe and on large, unwieldy equipment or products. It requires uniform baking to cure. If desired, the services of firms specializing in applying Unichrome Plastisols can be used.

This is one of many Unichrome developments in processes and materials which provide opportunities to cut your finishing costs . . . opportunities to turn out a better product through a better finish. We'd welcome the chance to work with you.

Unichrome is a trade mark of Metal & Thermit.



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ORGANIC COATINGS
TIN & TIN CHEMICALS
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RADIOGRAPHIC EQUIPMENT
WELDING SUPPLIES
METALS & ALLOYS
HEAVY MELTING SCRAP

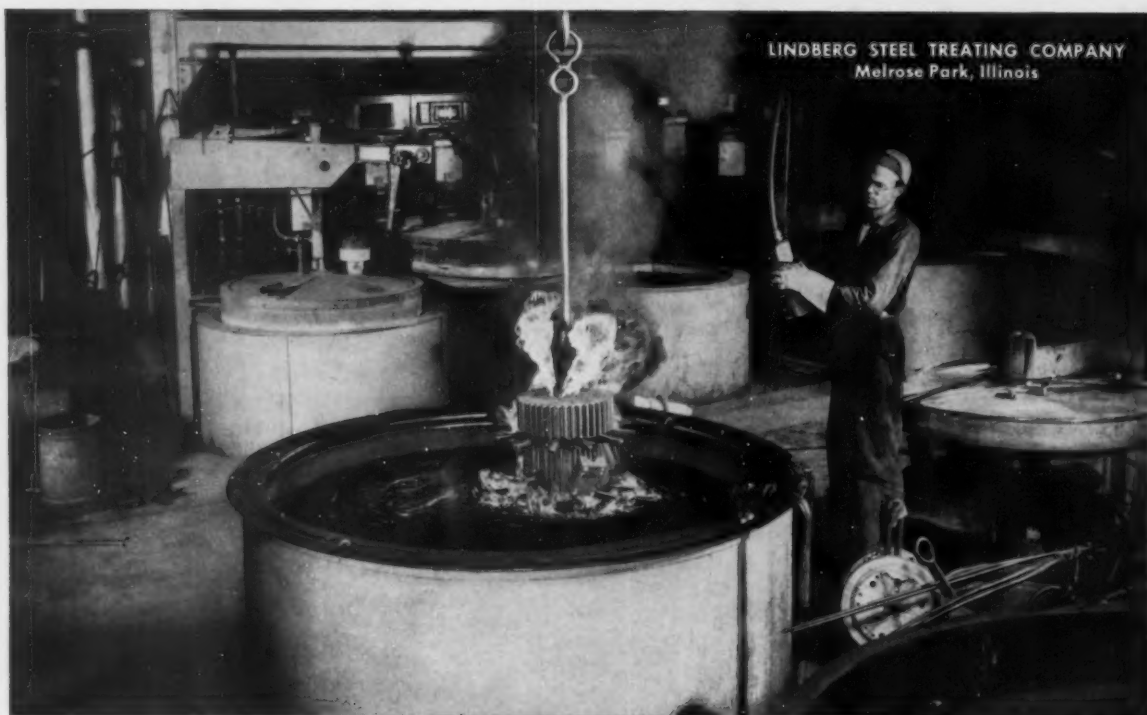


METAL & THERMIT
CORPORATION

GENERAL OFFICES: RAHWAY, NEW JERSEY

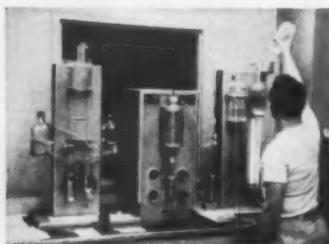
Pittsburgh • Atlanta • Detroit • East Chicago • Los Angeles

In Canada: Metal & Thermit—United Chromium of Canada, Limited, Toronto



LINDBERG STEEL TREATING COMPANY
Melrose Park, Illinois

For machine shop tolerances— Lindberg uses Cities Service Quenching Oil



Lindberg's Lab stringently tests treated metals. Dimensional changes from poor quenching oil would quickly show up here. But Cities Service Quenching Oil cools metal with no significant dimensional change.



Some of Lindberg's Furnaces. Here, they heat-treat all kinds of steel products . . . bolts, washers, gear blanks, saw blade segments, etc. Steel for bars of Illinois State Penitentiary was one of their first jobs.

At Lindberg Steel Treating Company a routine order might include a dozen shafts, stamping and forming dies, jigs and fixtures and even production parts. But though the products might differ, most would carry the same stipulation—heat treat with very low dimensional change.

To some heat treating operations this might present a problem, but not to Lindberg. By the use of Cities Service Quenching Oil, they're able to cool their steel with no significant changes in dimension.

"In addition," say Lindberg metallurgists, "we like Cities Service Quenching Oil because it has high flash point, consistent viscosity, excellent oxidation resistance, and a stable cooling rate."

Anyone looking for a better quenching oil would do well to try this superior Cities Service oil. For further information, talk with your local Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
NOV. 10, 1956	139,535	23,699
NOV. 3, 1956	123,588	20,509
NOV. 12, 1955	186,146	29,075
NOV. 5, 1955	173,000	26,950
TO DATE 1956	5,117,977	1,033,046
TO DATE 1955	7,165,143	1,150,950

*Estimated. Source: Ward's Reports

one of the carburetors works. The other two don't start to operate until the throttle on the engine is open over three-fourths of the way.

The multiple carburetors are a further step in Olds' program for more economy and more performance. Mr. Wolfram points out that ordinarily a driver will only be using one carburetor and thus the engine will run economically. But, if it is desired, the motorist has the reserve power of the 3 carburetors which can be used when they are needed.

The GM Div. is still experimenting with fuel injection and it is not known just when the system will be available. The actual unit is the same as that developed by GM's Rochester Products Div. But it has been modified to meet Oldsmobile's needs.

Tests so far show that the system increases car performance and generally improves the efficiency of the engine. Fuel injection eliminates carburetor icing and vapor lock. In addition, the number of unburned hydrocarbons discharged into the air during deceleration is also reduced.

Mr. Wolfram emphasizes that the present system, as applied to Oldsmobile, still presents problems.

He admits that Olds' fuel injection delivers higher torque at all driving speeds but adds that the ram tubes had to be specially designed to do the job.

So the biggest problem Olds has right now is to develop a cheaper design for the ram tubes that would keep all the advantages now present in the system. In other words, the system must be produced at a price which would make the increased performance worth the increased cost.

Earnings:

Chrysler's 3rd period report shows loss. Retooling costly.

Chrysler's third quarter earnings report reflects the seriousness with which the corporation was hit in the 1956 model year.

The company suffered a loss of over \$12 million in the period from July to the end of September. This is translated into a loss of \$1.42 per share.

For the first 9 months this year, the company made slightly over \$6 million compared to earnings of over \$70 million for the same period in 1955. Per share earnings for the whole period are equal to 72 cents compared to \$8.11 in 1955.

Chrysler claims that the decline in earnings is caused mainly by huge expenditures for tools and other equipment for the change-over to 1957 models.

This is perhaps so. Chrysler spent over \$300 million on its 1957 program and it suffered probably more than any other big company as regards new car sales in 1956.

But the company is optimistic. Early indications are that there will be a rising demand, generally,

Automotive News

for 1957 cars and Chrysler believes that the demand will be particularly big for its cars.

Factory Sales Tally

U. S. factory sales for the first 9 months of this year show how badly the auto industry fell off from the record of 1955 but also indicate that, by ordinary standards, 1956 was a good year.

Total car and truck sales for the period total 5,107,541, including 4,269,662 passenger cars, 834,574 trucks and 3305 coaches.

In the same period for 1955 total sales were 6,908,079. Broken down, they included 5,973,920 cars, 931,374 trucks and 2785 coaches.

With production scheduled at the peak for the fourth quarter, it looks like factory sales for the entire year will total slightly over the 6 million figure.

That's obviously not as good as the 1955 record, but industry executives insist that last year was a freak.

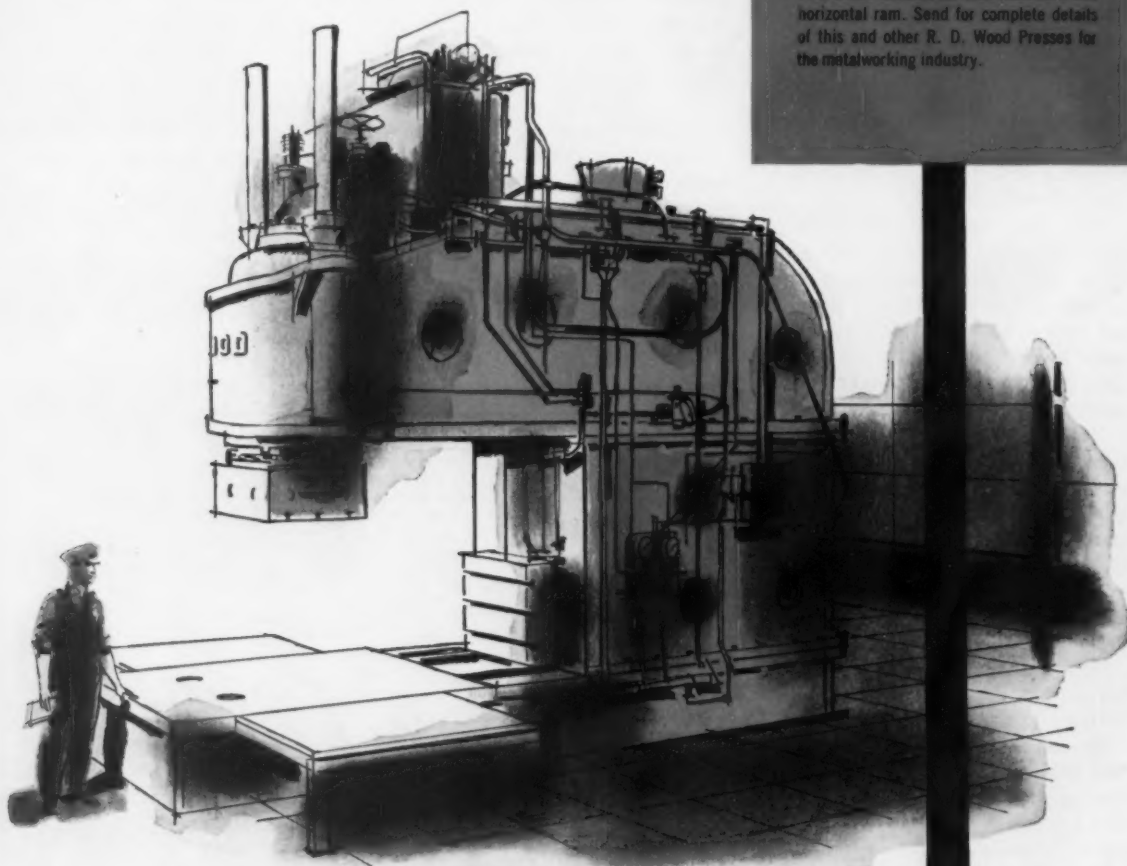
THE BULL OF THE WOODS

By J. R. Williams



***There's always a job for a Wood Press ...
and a Wood Press to do the job***

When you want a production shortcut—when downtime and costs need shrinking—there's a job for a Wood Press. And in almost every type of metalworking operation—there's a Wood Press to do the job. R. D. Wood makes standard presses for an amazing range of uses, besides designing others for special work. All have three things in common: sound design, carefully chosen materials, conscientious workmanship. *Result:* R. D. Wood Presses consistently deliver the utmost in smooth, dependable performance; fast, economical production; trouble-free operation. Write for catalog and engineering information—without obligation.



750 ton, HydroElectric open gap, self-contained press for straightening, flanging, forming, forcing and bending operations. Handles all metals. Valve system contains centralized controls for both main ram and horizontal ram. Send for complete details of this and other R. D. Wood Presses for the metalworking industry.

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Get Ready for Anti-Business Congress

Business and businessmen in government will be under attack from new Congress . . . Temper of last session will continue with most familiar faces back . . . Freight car shortage continues—By G. H. Baker.

♦AS A BUSINESS executive, you can expect the new Congress to throw some fresh fuel on some of the still-smouldering anti-business fires that sputtered and sometimes roared at the Capital for the past two years.

The new Congress won't be much rougher on business and industry than this year's Senate and House, but it won't be any easier, either. More and more, the Democrats are coming around to the idea that their drives for votes are most effective when centered on such issues as:

Businessmen in government . . . You can expect to hear plenty next year from Democrats in Congress concerning alleged "give-aways" by the Republicans.

Lobbying . . . Look for lots more "Case incidents"—high-pressure lobbying being "exposed" by law-makers outraged at business.

WOC's . . . Renewed and continuing congressional investigations aimed at "proving" that businessmen recruited by the Eisenhower Administration as expert advisors can—and by implication are—taking advantage of the situation for personal or company gain.

The 1956 election in which Eisenhower was re-elected by an avalanche but failed to carry control of Congress with him, proves one important point most politicians, pollsters, pundits, and businessmen miss: In these days, there is a growing trend for people to vote for people, not parties and issues.

Car Scarcity Grows

The freight car shortage, already responsible for choking off a sizeable volume of potential industrial activity, is going to get worse before it gets better, government experts predict.

Shortage of cars is now running about 10 pct of the total demand for cars. Big-volume industrial shipments of all manufactured goods, plus heavy crop movements, are causing the tighter-than-usual situation.

Nationwide, the car shortage is averaging about 18,000 units a day.

Trouble is, the railroads are continuing to scrap old cars as fast as they build new cars. While freight traffic movements continue to climb, the number of cars stays the same. However, the roads are speeding repair work on "bad order" cars, thus adding to the serviceable fleet.

Government officials say there are numerous reports of steel mills being forced to store steel on the ground because of a lack of freight cars. As a result, trucks are gaining some new business, but highway transport is not always a satisfactory solution to the problem of moving extra-heavy industrial goods.

Coal and heavy steel products, for example, still have to move by rail, except in relatively few instances where trucks can handle short hauls to the satisfaction of shippers and customers.

Some industrial shippers would like to see the government set up a tight new program of steel allocation geared to insure greater production of freight cars. But there is no real indication in government planning circles that such an allocation program will be put into effect anytime soon unless the U. S. is forced into war.

Excise Taxpayers To Have Their Day

■ A double-barreled study of the nation's tax laws by two congressional subcommittees is getting underway. It will give businessmen an opportunity to air their pet tax peeves.

The probes, authorized by the House Ways and Means Committee, are concerned with both tax rates and technical phases of the tax laws—particularly the excises.

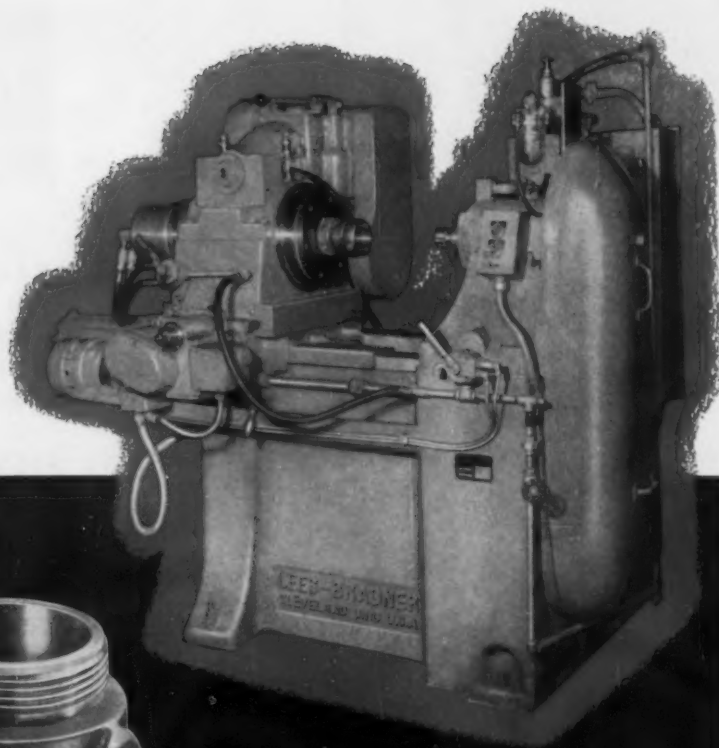
One subcommittee is searching for ways to:

- 1) Improve administration of tax laws.
- 2) Increase efficiency and morale in the Internal Revenue Service.
- 3) Provide more fairness to taxpayers.

The other subcommittee is studying excise revisions. Hearings will get underway Nov. 26. Some 50 persons have asked to testify.

It took
this
HIGH-SPEED
Heavy-weight

to lick this
tough job!



The Lees-Bradner Special High Speed Thread Milling Machine



The Lees-Bradner Special Thread Milling Machine really shows its class when it works with brass!

The Akron Brass Manufacturing Company of Wooster, Ohio produces these threads, internal and external, each in 13 seconds with a 5000 RPM cutter spindle speed.

This is just one example of the many threading jobs that the modern, high speed, Special Thread Milling Machine can do better, faster and with unmatched precision.

Write The Lees-Bradner Company for full information on this remarkably versatile machine.

DETAILS ON THIS JOB

Hob Spindle Speed, 5000 R.P.M.
(Using a high speed cutter spindle)

Thread Pitch
(internal and external) . . . 7½

Thread Diameter 3"

Length of Thread ¾"

Threading Time 13 seconds

Material Brass

Weight of Parts

Internal thread . . 1 lb. 13 oz.

External thread . . 2 lb. 10 oz.





Metals Will Share in Aircraft Bonanza

As plane industry zooms ahead in next fifteen years look for more metalworking activity on Coast . . . Farwest builders will get bulk of orders for commercial, military planes and guided missiles—By R. R. Kay.

♦ **JET-AGE TRANSPORTATION** is in for a rocket rise. Forecast: Airlines will spend one-half billion dollars a year for the next fifteen years—a total of \$7.5 billion!

That's what it will take to meet the demand for long-, medium-, and short-range passenger planes; cargo planes; and helicopters. And that amount is in addition to the over \$2 billion now on order for new airliners, both jet and turbo-prop.

Metals Will Share . . . It means the years ahead will find even bigger metalworking concentration on the West Coast. For almost all of the future aircraft orders are sure to go to plane manufacturers on the Coast. Boeing, Convair, Douglas, and Lockheed are in an enviable position.

However, despite the fabulous future for commercial aircraft, it's only part of the pie. By far, the major portion of the business is in aircraft and guided missiles for the military.

Planes Aren't All . . . There's more to the metalworking story than just building all these planes. Thousands of companies around the country will be busy filling the need for: (1) new and expanded airport terminals and hangars; (2) service and maintenance tools and equipment; and (3) baggage and cargo handling devices.

Keen aircraft-industry analysts predict orders for 200 to 300 large-size jetliners, and for some 1500 medium and short range. That's above what's now on the books.

The New Dimension . . . What's behind this rosy outlook? Big factors are increasing U. S. population; rising standard of living; 10-year forecasts for a doubling of passenger traffic, trebling of air freight; growth of helicopter feeder-lines; the huge piston-engine plane replacement market.

Look for big changes in our way of doing business and in distribution. Today's easy one-day trips, e.g., New York to Washington and return, will take on a new dimension. It'll be New York to Los Angeles or San Francisco, and return same day. And air-shipped products will find their way in greater numbers to vast new markets.

In 1975 you'll travel from San Francisco to New York in 1 hr 45 min., according to Boeing. Your

plane will be a 200-passenger jetliner going at 1500 mph at 50,000-ft altitude.

West Coast Briefs

Boeing Airplane Co. is now selling its gas turbine engine to industrial firms. Buyers include automakers, earth-moving-equipment manufacturers, oil companies.

Steel from Chile is helping metal-hungry Pacific Northwest industry. Some 12,000 tons of bars, plates, and sheets moved across Seattle docks this year.

Western Canada has a treasure of untouched resources. Among them are minerals and oil. T. C. Douglas, Premier of Saskatchewan, pointing out their increasing significance, is urging natural resources development.

Planes Are Planned For Different Needs

♦ **DEVELOPED** for different missions, contrast between these two new Lockheed Aircraft commercial airplanes is clearly evident. The 1649A Super Constellation (left) is described as the longest-range airplane in the world, capable of non-stop flights up to 6300 miles without consuming its fuel reserves. It has a 150-ft. wingspan and carries 9600 gallons of fuel. The sturdy 1049H (H for Husky), identical in dimensions with the Super G, can carry up to 20 tons of cargo, equivalent to two freight-car loads, or it can be converted in a few hours into a comfortable airliner for 92 passengers.



ever see a **METAL SAW**

that thinks
for itself?



MARVEL SAWS'
Automatic "Brain"
Adjusts Blade
Feed Pressure
and Depth on
Every Stroke to

**GIVE YOU FASTER
CUTTING-OFF**

The exclusive automatic Dual Power Feed built into every MARVEL Series 6 and 9 Hack Saw is the "brain" that adjusts and compensates both pressure and depth of feed correctly in proportion to the number of blade teeth in contact with the work. Once the MARVEL Dual Feed is set, no operator attention is required to insure that the blade is cutting as deeply as possible and practical on every stroke . . . regardless of the changing area of the work being cut. Whether the Saw is being used for continuous automatic cut-off of identical pieces or a single cut, the MARVEL Dual Feed that practically "thinks for itself" guarantees that the work is cut-off in the fewest possible number of strokes.

Heavy duty MARVEL Series 6 and 9 Hack Saws embody every practical design and operating feature to give you speed, accuracy and operating economy you can find in no other metal cutting saws.

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Catalog and complete
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Saws



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S-1304



New Officers: NMTBA



NEWLY ELECTED officers of the National Machine Tool Builders Assn. include (left to right): President Jerome A. Raterman, Monarch Machine Tool Co.; Exec. Vice Pres. Ludlow King; 1st Vice Pres. Alfred V. Bodine, Bodine Corp.; Secretary Walter K. Bailey, Warner & Swasey

Co.; Treasurer Perrin G. March, III, Cincinnati Shaper Co.; 2nd Vice Pres. Ralph J. Kraut, Giddings & Lewis Machine Tool Co.; and new member of the board of directors, Edward R. Smith, Seneca Falls Machine Co.

Metal Cutting Tools Slice Up Bigger Pie

President of National Machine Tool Builders Assn. tells metal cutting tool makers their industry has increased volume at twice overall national rate . . . Sees outlook bullish—By E. J. Egan, Jr.

♦ U. S. METAL-CUTTING machine tool industry "in the last five years has increased its annual volume at a rate twice as rapid as the overall growth of our total national economy." Members of the National Machine Tool Builders Assn. heard this encouraging news from association president Louis Polk in Chicago at the annual Fall Meeting.

Specific figures show the gross national product climbed from \$285 billion in 1950 to an estimated \$408 billion for 1956, about 70 pct increase, according to Mr. Polk. But "our industry's shipments have climbed almost 3 times, from about \$305 million in 1950 to approximately \$860 million in 1956," he said.

Mr. Polk sees the industry's five-year performance record as evidence that future business, in both shipments and new orders, will average \$1 billion yearly. "If the

nation keeps its financial house in order," he said, "that sum can be the base . . . from which we build in the years ahead."

From Whence . . . The NMTBA president listed several factors which, in his opinion, will stimulate the industry's future growth. "No matter how our country's growth is projected, whether in terms of aircraft, new highways, or TV sets and other consumer or durable commodities, these products will only be produced by, and flow from machine tools," he predicted.

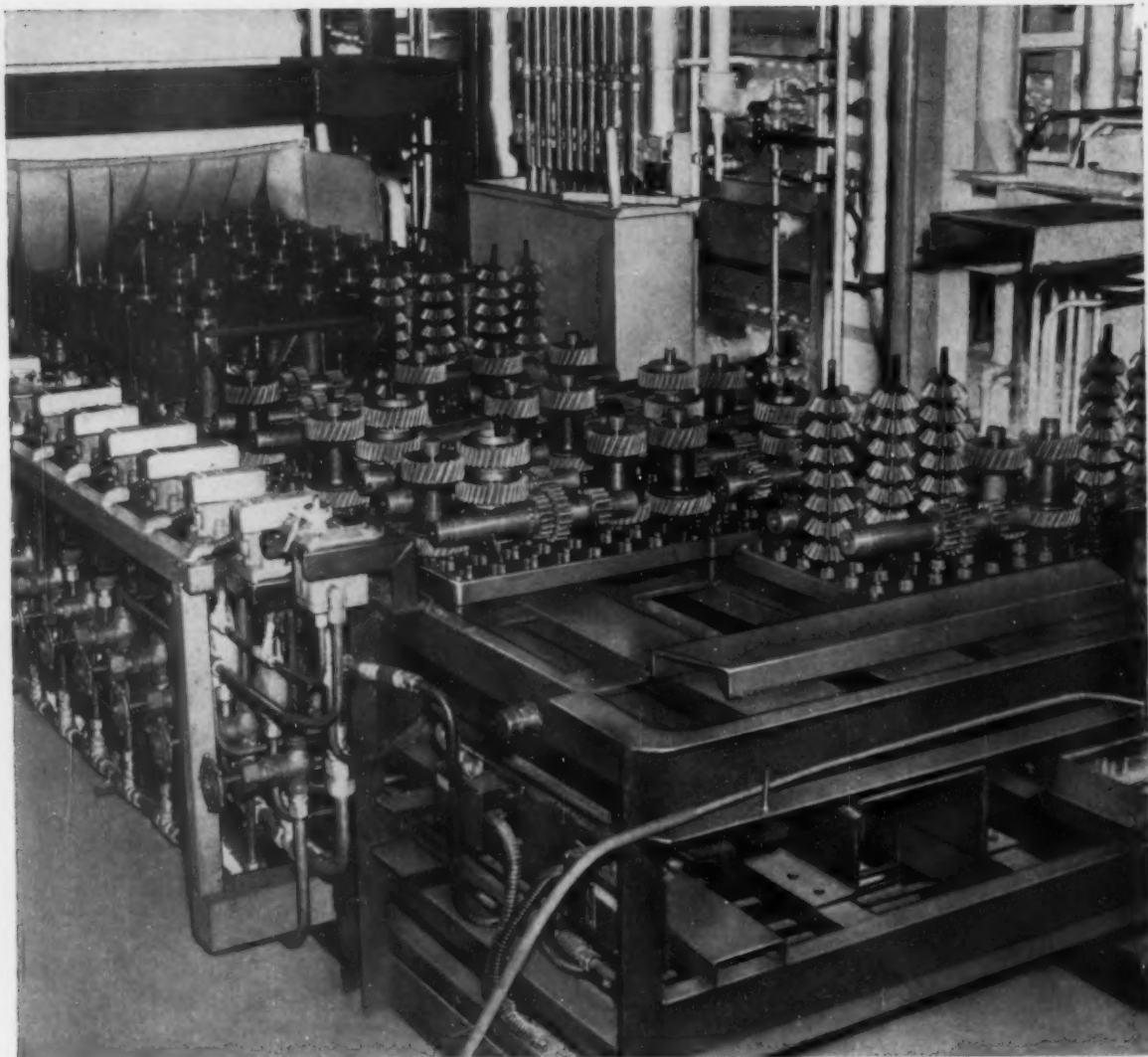
Important social currents will aid the industry's growth pattern also, he said. The high standard of living of the average American, stems from the increased productivity of modern machine tools.

Terming the combination of industrial, scientific, economical and social factors as "inescapable," he

believes they will continue to force a relentless trend toward mechanization.

Investing . . . Mr. Polk also sees an encouraging outlook for builders in the fact that U. S. investments in new plants and equipment during the first six months of this year were nearly 30 pct ahead of the comparable 1955 period. "By the end of the year," he said, "this investment may well amount to between \$35 and \$40 billion."

Tell Your Story . . . With the machine tool industry facing an era of both increasing productivity and profit, Mr. Polk sees it as an excellent investment opportunity. "It is clearly in the interest of the financial community. . . and the investing public . . . to encourage our industry's growth with adequate new capital resources."



Surface[®] zoned gas carburizing toughens gears, cuts steel costs

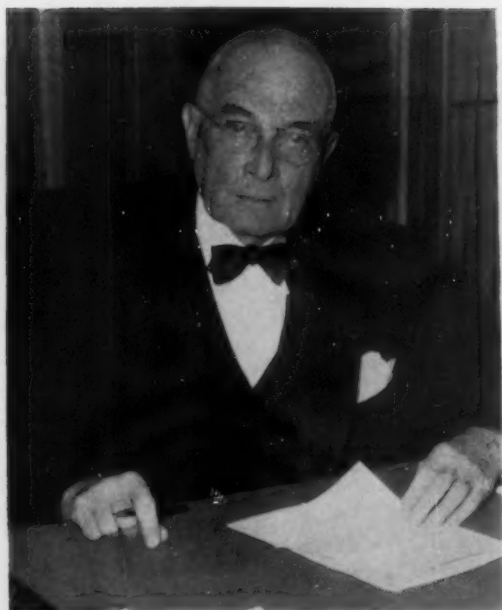
The manufacturer of these heavy duty truck gears improved metallurgical properties and reduced material and labor costs when he adopted Surface zoned gas carburizing. Unique atmosphere manifolding enables him to limit surface carbon content (.80% max.), get sufficient case depth, and still maintain good carburizing rates (530-900 net lbs./hr.). With the quality of Surface carburizing, he could use steels lower in alloy content.

Cases like this explain why 1,500,000 cfh of atmosphere gas are generated daily in Surface generators. For quality carburizing at competitive costs, check with Surface.

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The Iron Age

SALUTES

Edwin R. Smith A pioneer in the development of automatic machine tools, he earned a national reputation as a designer; is now president of the Seneca Falls Machine Co. He is a past vice president of the SAE.

If suspenders ever come back into style, Edwin R. Smith might excusably feel the pangs of sentiment. For had it not been for the clattering machinery in a Fitchburg, Mass., suspender factory that captured his boyish imagination more than 50 years ago, he might never have gotten into the machine tool business.

He might never have taken a helper's job with the Fitchburg Machine Works, or worked his way up to the presidency of that firm (now the Seneca Falls Machine Co.), or invented the automatic lathes which earned him his reputation as a designer, or been elected a vice president of the Society of Automotive Engineers.

Mr. Smith, or just plain "E.R.," as he is called by his friends, has a creative genius that is backed up by engineering foresight and a keen knowledge of many subjects. He is at his best when working out the details of a new machine.

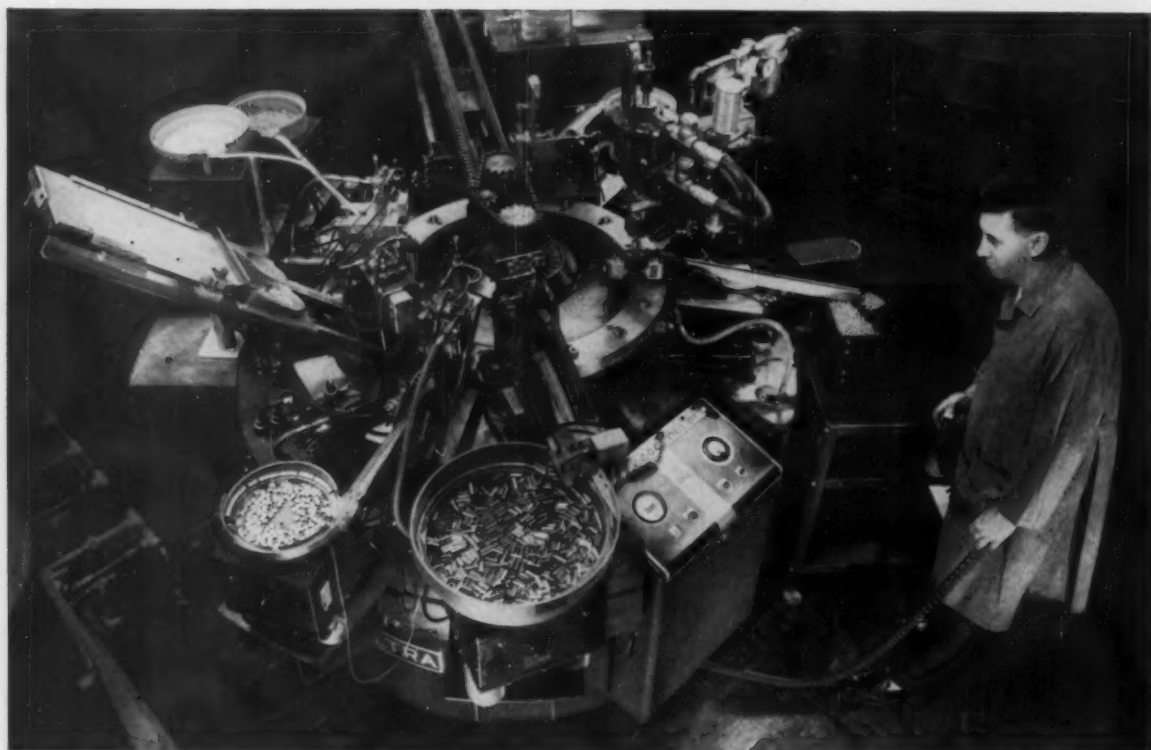
In 1925, he designed his first fully automatic lathe, and during the next 30 years designed and successfully marketed at least 25 other machine tools. He was one of the first to install automatic handling equipment on lathes. His creative ability has contributed immensely to metal working and played an important part in the growth of the Seneca Falls Machine Co.

Down through the years, he has been an active member in the American Society of Tool Engineers, the American Society of Mechanical Engineers and is a past vice president of the SAE.

At 66, while still active in the management of his firm, he allows enough time to run one of the finest dairy farms in the Finger Lake region of upstate New York. It includes a herd of 125 registered Holstein cows. While Mr. Smith is on the farm, the affairs of his company are ably handled by his son, Edwin Jr., executive vice president.

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Such signals may be electrical, pneumatic or hydraulic. Thus, they must be conveyed either by wiring or by tubing.

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per's outstanding conductivity makes it practically indispensable.

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The Iron Age INTRODUCES

Burton C. Smith, named asst. vice president, distribution, Columbia-Geneva Steel Div., U. S. Steel Corp., San Francisco.

Paul H. Harn, elected vice president and secretary, **The Lowe Bros. Co.**, Dayton, O.; **Edgar W. Fasig**, elected vice president, manufacturing, technical and production operations; **William C. Rhodes**, named vice president, sales; **Lester L. Hunter**, named treasurer; **Stewart E. Lower**, named general superintendent; **Emerson J. Shough**, named general auditor, general accounting.

John E. Spears, elected vice president and general manager, Gas and Coke Div., **Koppers Co., Inc.**, Kearny, N. J., and St. Paul, Minn. plants. He has been appointed regional representative, Eastern district, of the entire company.

Robert C. Ressler, appointed vice president, manufacturing and engineering, Ball and Bearing Div., **Hoover Ball and Bearing Co.**, Ann Arbor, Mich.

Thomas A. Kelly, elected president and chief operating officer, **LaSalle Steel Co.**, Hammond, Ind.

O. V. Tally, appointed manager, Washington district, **Allis-Chalmers Industries Group**.

Robert W. Bowman, named controller, **Lukens Steel Co.**

Clyde R. Dean Jr., named general sales manager, Yale Materials Handling Div., **The Yale & Towne Manufacturing Co.**, Philadelphia.

H. J. Halliday, named director, purchases, **The Jeffrey Manufacturing Co.**, Columbus, O.; Purchasing agents appointed were: **C. A. Lane**, Industrial Div.; **C. E. Firestone**, Mining Div.; **E. L. Corwin**, machinery and factory supplies.

Herbert A. Beyer, Jr., named sales manager, Machine Tool Div., **DeVlieg Machine Co.**

Ray H. Rogers, named sales manager, industrial components, Specialty Transformer Dept., **General Electric Co.**, Fort Wayne, Ind.; **Harold W. Fisher**, named manager, sales to distributors, contractors, and users.

Dr. H. W. Schultze, named asst. manager, chemical development, **Climax Molybdenum Co.**, New York.

G. E. Conn, appointed manager, Buffalo district, **Allis-Chalmers Manufacturing Co.**, Milwaukee; **Henry E. Weiss**, named special representative, Buffalo; **MacGregor G. Jones**, named manager, York district, **Allis-Chalmers Industries Group**.

Louis S. Lasota, named district accountant, Chicago district, **Republic Steel Corp**; **Dale B. Allen**, named asst. district accountant.



WALTER F. MUNFORD, named asst. executive vice president, American Steel & Wire Div., U. S. Steel Corp., Pittsburgh.



VAN H. LEICHTER, elected president, American Steel & Wire Div., U. S. Steel Corp., Cleveland.



W. H. BENNETT, elected president, The Hydraulic Press Mfg. Co., Mount Gilead, O.



ALLEN W. ROCKWELL, elected vice president, Waterbury Div., The American Brass Co., Waterbury, Conn.

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Kaiser Engineers is seeking a man of unusual skill and experience. He must have at least 10 years of progressive integrated steel plant development experience. He must know plant layout, construction design, and be of managerial caliber. He will be charged with the continued development of new steel plants and the expansion of existing plants in the U.S. and abroad. His salary will be more than generous.

This man and his family will enjoy indoor-outdoor living in the mild, smog-free San Francisco Bay Area. Here are fine new schools and famous Universities, the culture and sophistication of San Francisco, plus year around recreational opportunities ranging from sea to Sierra and including all sports.

This man will enjoy, too, life insurance, free family health plan, retirement, moving allowance and other perquisites.

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PERSONNEL

John Q. Holmes, named director, production engineering section, **General Motors Technical Center**, Detroit.

Following appointments are within the Sales Dept: of **Pittsburgh Steel Co.** **Kenneth H. Bender**, named manager, secondary sales, Pittsburgh; **H. L. Mills**, named district sales manager, Chicago; **A. S. Gardner**, named asst. manager, tubular specialties sales; **Stewart E. Davis**, named asst. to manager, sheet sales.

Glen H. Lufcy, appointed superintendent, Ottawa, Ill. works, **Laclede-Christy Co.**, Div. of **H. K. Porter Co., Inc.**, St. Louis, Mo.

Francis P. Blonska, appointed administrative assistant, sales, **Cleveland Cap Screw Co.**, Cleveland, O.

William E. Wallace, named supervisor, Navy and Marine Installation, Small Steam Turbine Dept., **General Electric Co.**, Fitchburg, Mass; **George Dale**, named specialist, industrial and utility service.

Howard H. Wilder, named manager, engineering sales, **Vanadium Corp. of America**, New York.

Robert H. Madden, Jr. named manager, metallurgy, inspection and research, Coal & Iron Div., **U. S. Steel Corp.**, Birmingham, Ala.

Arthur J. Hedges, named asst. sales promotion manager, Edison Storage Battery Div., **Thomas A. Edison, Inc.**, West Orange, N. J.

Clive C. Earle, named manager, alloy and stainless steel sales, Pittsburgh plant, **Joseph T. Ryerson & Son, Inc.**

Thomas J. Jones, named chief engineer, Building Materials Div., **Wheeling Corrugating Co.**, Wheeling, W. Va.

Donald F. Sengenberger, named superintendent, Wire Div., **Waukegan Works**, **American Steel And Wire Div., U. S. Steel Corp.**



JAMES L. ORTNER, named comptroller, **American Bridge Div., U. S. Steel Corp.**, Pittsburgh.



JOHN P. LYNN, named manager, manufacturing, **The American Welding & Manufacturing Co.**, Warren and Niles, O.

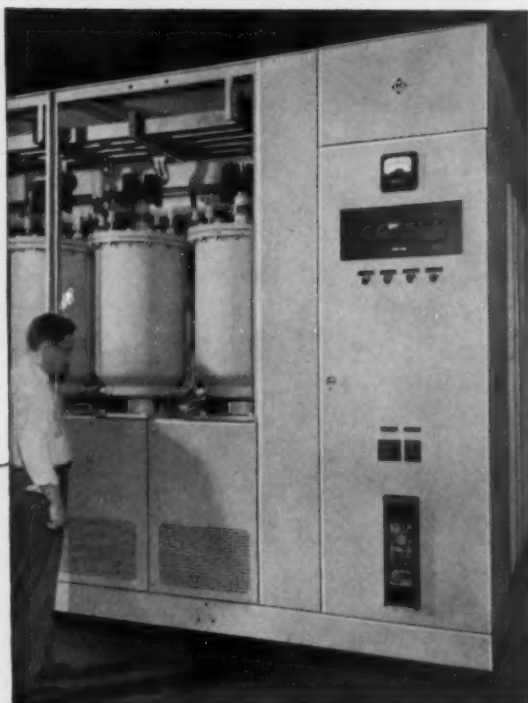


GEORGE M. CHANDLER, named sales manager, **Carmet Div., Allegheny Ludlum Steel Corp.**, Ferndale, Mich.



J. J. KEANE, appointed asst. general sales manager, **Landis Tool Co.**, Waynesboro, Pa.

Two Separate Circuits Mean Reliable Rectifier Operation



ALLIS-CHALMERS Mercury Arc Rectifiers

One of four metal-enclosed assemblies in a midwestern installation with a total capacity of 15,000 kw at 620 volts, dc.

1. Firing Circuit

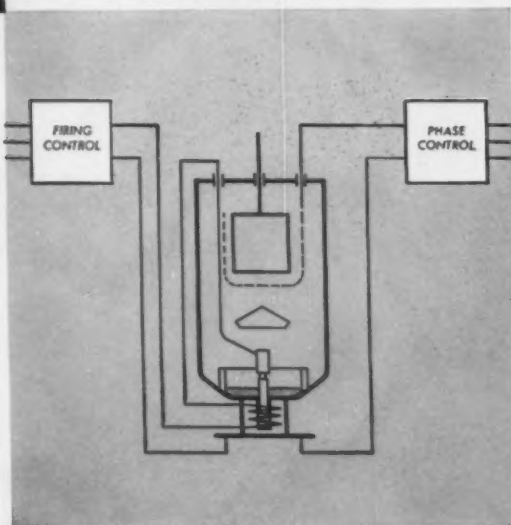
A small dc excitation arc is automatically ignited only once, when the unit is started. It is then maintained on the mercury cathode of each rectifier tube. It offers advantages similar to a pilot light. Since it is far easier to maintain an arc than to start it, this feature reduces the chance of the excitron losing excitation during power supply disturbances.

2. Phase Control Circuit

A separate circuit utilizes the deionizing grid to obtain phase control. Grid-type phase control permits operation in the clean region near the anode where ion density is lowest, instead of on the surface of the cathode mercury pool where there is turbulence and contamination. Reliability of phase control does not depend on the condition of the mercury. This is an exclusive excitron feature.

Only Excitron Rectifiers Provide Separate Circuits

for these two all-important functions. Improved operation results — one function is never sacrificed for the other — you get optimum operation from each.



For Complete Information on rectifier operation, call your nearby A-C office, or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

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A-5136

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Now in plentiful supply, the new "200" Series Stainless Steels permit steelmakers to greatly expand their output of Chrome-Nickel stainless from existing nickel supplies. With the addition of manganese, the nickel content can be cut in half to provide practical, workable stainless steels that can be applied to a wide variety of uses.

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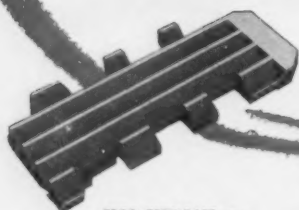
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November 15, 1956

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ESCO SHELLCAST Valve Linkage Levers. Alloy steel Type 317, A296-49T CF-8M.



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In Canada, ESCO Limited
Manufacturing Plants
Vancouver, B.C., and
Toronto, Ontario.

PERSONNEL

Irvin R. Spangler, appointed asst. sales manager, Machine and Tools Div., Michigan Tool Co., Detroit.

John W. Hammarberg, appointed district representative, Detroit area, Heppenstall Co., Pittsburgh.

Robert G. Shrake, appointed asst. district sales manager, Buffalo, N. Y., Republic Steel Corp.

Following appointments are within the Technical Service Div., Research and Development Dept. of **Jones & Laughlin Steel Corp.**, Pittsburgh. **Dr. Terence E. Dancy**, appointed development engineer, process development section; **Richard L. Guernsey**, appointed metallurgical contact engineer, tubular products.

Conrad Hohmann, named asst. chief engineer, special airborne devices, Vickers Inc., Detroit.

Frank W. Krohn, appointed field engineer, Detroit district office, Norton Co., Worcester, Mass.

Following appointments are within the American Steel and Wire Div's Cyclone Fence operation of **U. S. Steel Corp.** **Joseph F. Boyce**, named sales manager, Eastern area, Newark, N. J. headquarters; **C. J. Kinman**, appointed manager, sales, Southwest area, Fort Worth, Texas office.

G. J. Tozzini, named purchasing agent, Minerals and Solid Fuels Div., General Purchasing Dept., Union Carbide and Carbon Corp., New York.

OBITUARIES

K. P. Fuhrmann, 67, retired sales executive, Wheeling Steel Corp., Wheeling, W. Va.

Joseph F. Ryan, 61, asst. secretary and asst. treasurer, Allis-Chalmers Manufacturing Co.

Harold E. Stavers, 63, sales manager, Detroit plant, Joseph T. Ryerson & Son, Inc.



TIPS FROM A ROLL MAKER'S NOTEBOOK

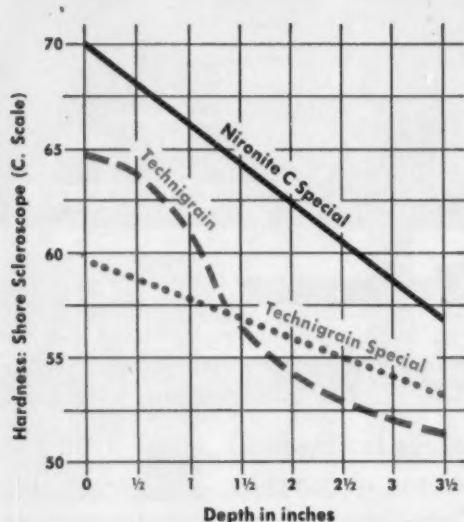
MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

A merchant mill roll should be just good enough



Easy to turn: Mack-Hemp Technigrain and Technigrain Special rolls are readily turned and redressed.



Technigrain rolls compare favorably in hardness penetration with more expensive, higher-alloy types, as shown by these generalized curves.

The wise purchaser of merchant mill rolls buys rolls that give him the service life he needs *and no more*.

This is because increased roll service life usually goes hand in hand with higher alloy content and more complex heat treatment. Both add to the price of the rolls. But... most merchant mill operators redress their rolls after each production run. Thus, if a set of rolls is still good for more tonnage before redressing at the end of a run, chances are that the rolls are too good—and therefore too expensive—for the job.

But price is not the only consideration. To be just "right", a merchant mill roll should (1) offer wearing qualities closely related to the length of the production runs for which it is used; (2) have good hardness penetration to provide wear resistance at the bottom of passes; and (3) have grain structure fine enough to assure good finish of the rolled product.

Quality at low price. Mack-Hemp Technigrain and Technigrain Special rolls offer an inexpensive solution. In fact, Technigrain rolls are so generally useful for all merchant shapes that they have virtually eliminated the roll inventory problem for many operators. At a price that averages several cents per pound less than higher-alloy grain rolls, Technigrain and Technigrain Special provide service life adequate for the vast majority of applications. Available in a hardness range of 55 to 60 Shore (C Scale), they offer good hardness penetration and finely dispersed graphite to provide a smooth work surface. Of course, for unusually severe merchant mill service, Mack-Hemp's Nironite C Special offers all of Technigrain's properties, in a higher hardness range.

To sum up, Technigrain is the ideal roll for general merchant mill use: it is low in cost, it provides sufficient service between redressings, and it rolls products of better-than-adequate surface finish.

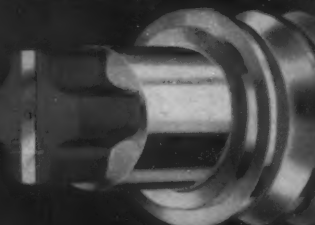
Technigrain is only one of the more than thirty types and hundreds of iron and steel roll analyses produced by Mack-Hemp. For advice and information relating to your specific roll application, why not 'phone or write us today? There's no obligation. Address Mackintosh-Hemphill Division, E. W. Bliss Co., Pittsburgh 3, Pa.

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You get more tonnage from the rolls with the Striped Red Wabblers

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery



A Great Team

• in any forge shop

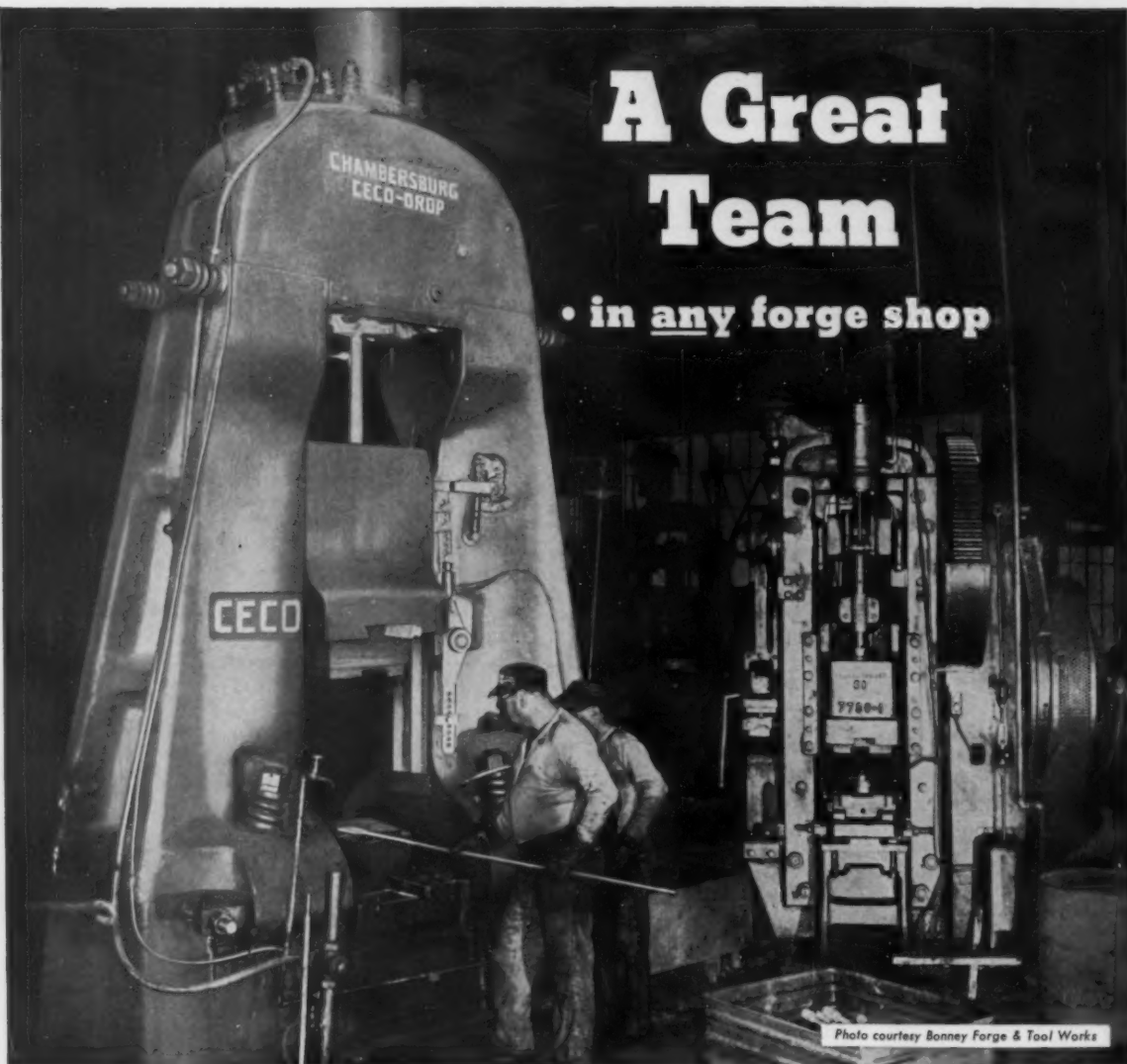
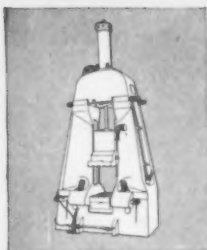


Photo courtesy Bonney Forge & Tool Works



CHAMBERSBURG CECO-DROP

- Piston-lift • Gravity drop
- Costs less to operate
- Forges more minutes per hour
- Forgings made faster
- Operation is easier and safer
- Maintenance is cheaper
- Full stroke or short stroke without interruption
- Over 400 in service in over 100 forge shops

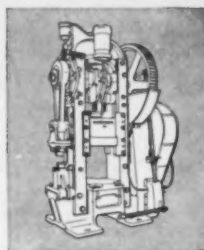
Ceco-Drop and Trimmer • • for top production

When the chips are down, it is continuous, trouble-free, quality production that puts you ahead of competition. That fact explains why the Ceco-Drop (in combination with the "indestructible" Chambersburg Trimmer) has become in nine short years, the standard gravity drop hammer of the forging industry.

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CHAMBERSBURG ENGINEERING COMPANY
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How to cut costs with

ALEMITE

Accumatic

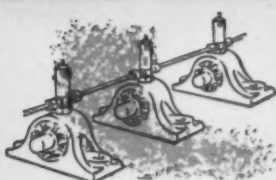
CENTRALIZED AUTOMATIC LUBRICATION



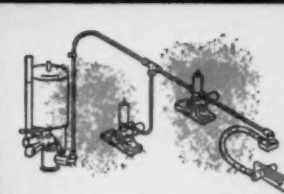
Can be built into any machine,
in **4 easy steps**



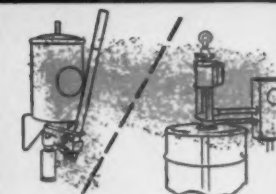
1. Replace grease cups or grease fittings with Accumatic fittings. (Available in same thread sizes as grease fittings, cups.)



2. Connect Accumatic fittings with copper tubing. (Alemite has tubing, clips and accessories for fast, neat installation.)



3. Connect sliding, rotary or oscillating parts into tubing system. (Flexible hose and swivels available for moving parts.)



4. Provide central pump to supply lubricant to system. (May be ordinary hand pump or fully automatic barrel pump.)

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For fluid oil or light grease. In range of sizes, delivering from .005 to .100 cu. in. of lubricant. Various shapes: Tees, straight-thru, inserts, angles. Spring pressure provides gradual feed. Adjustable or fixed output. System serves up to 400 bearings. Manual or automatic operation available.

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Exhaustive in-the-field tests show no appreciable variation in the amount of lubricant discharged after 73,312 lubrication cycles—equal to 122 years of twice-a-day service!

Offers All These Advantages!

- Prevents application of wrong lubricant.
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- No parts are neglected—lubricates inaccessible and dangerous bearings.
- Eliminates product spoilage due to over-lubrication.
- Eliminates point-by-point lubrication methods—services all bearings in one operation.
- Delivers exact amount of lubricant to bearing.

ALEMITE

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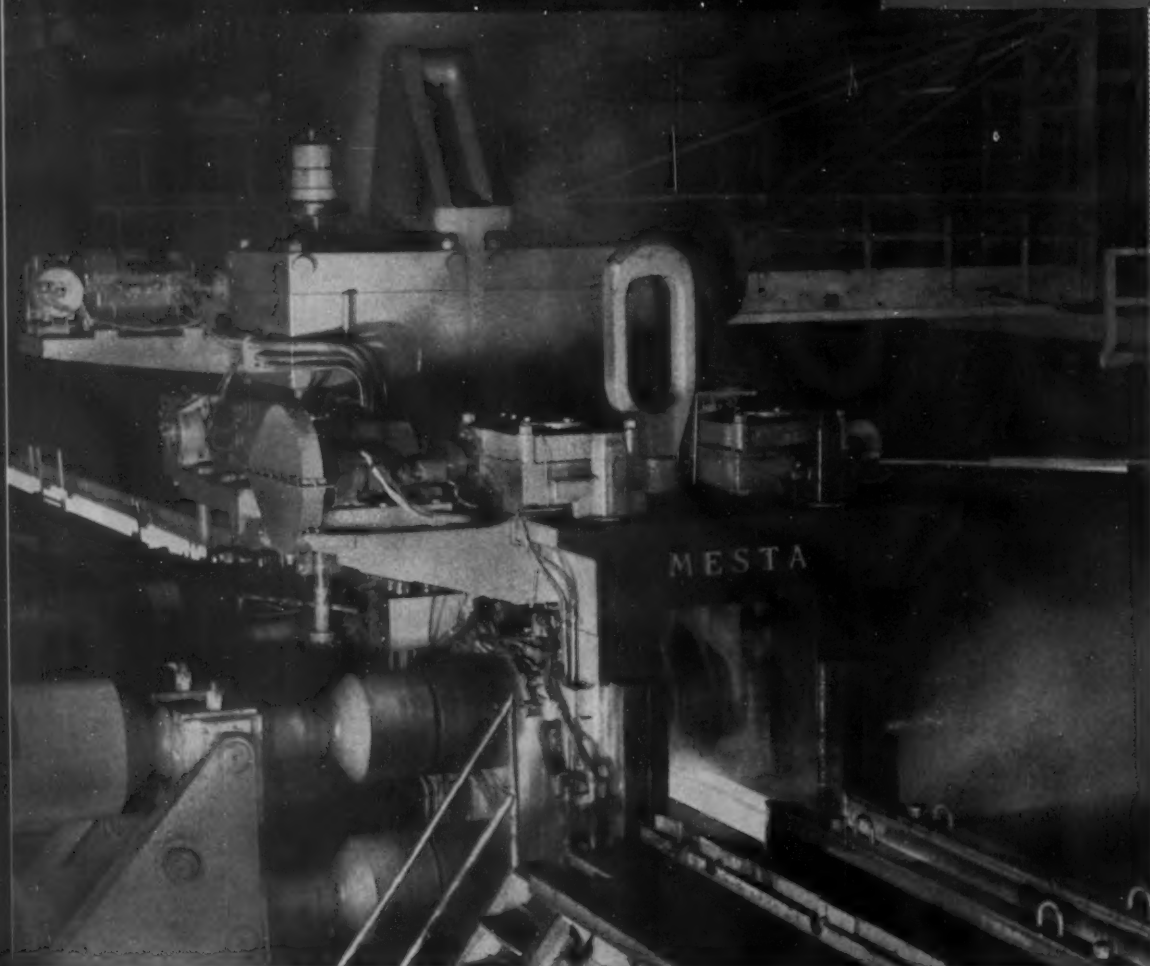
City State

November 15, 1956

129

WIDE FLANGE BEAM AND STRUCTURAL MILLS

Designed and Built by
MESTA



MESTA Universal Structural Mill rolling wide flange beams on the 44" Universal Stand and the 34" Edging Stand at Inland Steel Company, Indiana Harbor Works

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY
PITTSBURGH, PENNSYLVANIA

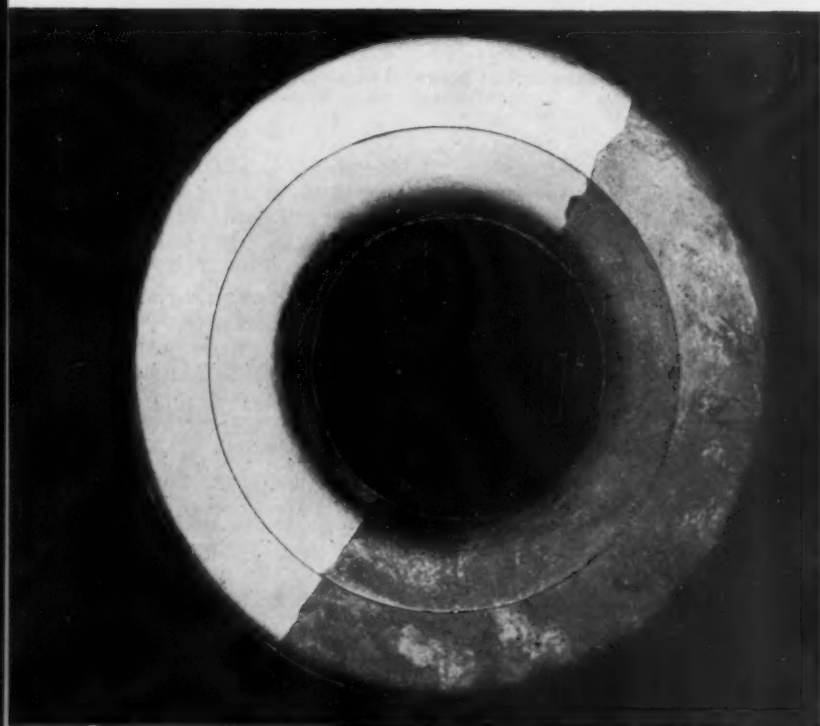


THERE IS NONE BETTER

By P. M. UNTERWEISER, Metallurgical Editor

Link to product quality—

Pros And Cons Of Heat Treat Stop-offs



CERAMIC coating spalls off metal on cooling from 1-hour annealing cycle at 1950°F.

Photo courtesy of Solar Aircraft Co.

♦ Choosing the right heat treat stop-off is a decision that can directly affect costs, product quality, performance . . . How about copper plate? . . . Or some of the proprietary paints that can be readily brushed on or sprayed?

♦ If the decision is yours to make, here is a rundown on some of the stop-offs you'll want to consider . . . What they're like, how they work, where they can and can't be used are some of the relevant questions aimed at improving your heat treat quality.

♦ HEAT TREAT STOP-OFFS might be expected to be of more immediate interest to heat treaters and shop metallurgists. These are the men who are obliged to cope with stop-off problems on a day-to-day basis.

But taking the broader view, the problem of stop-offs—specifically, which stop-off to use for a particular heat treating application—can, and often does, affect the interests of a large segment of engineering, inspection, manufacturing, and purchasing. Where heat treatment is involved and a stop-



Photo courtesy of General Electric Co.

DEW POINT reading checks carbon potential of atmosphere to avoid oxidation of copper plate.

off is mandatory, the quality of the end product can be significantly affected by the ability of a stop-off to do the job for which it is intended.

The importance of heat treat stop-offs stems primarily from their potential influence on the quality of the finished product. From the engineering standpoint, this influence may be measured in terms of physical and mechanical properties, product performance. The interests of inspection are likely to closely parallel those of engineering.

Plating leads

From the standpoint of manufacturing, choice of a particular stop-off may result in acceptable machinability—or the lack of it. Even purchasing can be intimately involved in the problem of stop-offs when heat treating is handled on a subcontract or job shop basis.

Aside from proprietary paints,

lacquers, and ceramics, the most widely used heat treat stop-offs are electroplated coatings. Listed in order of their popularity, these include copper, bronze, and tin. Tin—once used almost exclusively as a stop-off in nitriding—has been largely replaced by bronze for reasons of cost and governmental restrictions.

In common with proprietary stop-offs, electroplated coatings serve two principal functions in heat treating: 1) they prevent decarburization or carbon "pick up" during hardening, normalizing, annealing, or high-temperature tempering of steels, and 2) they provide steels with an effective stop-off in selected areas during carburizing, nitriding, or carbonitriding.

To observe the proper application of plated stop-offs in actual production, let's follow some of the basic steps in the manufacture of a low carbon, low alloy steel spur gear. Ultimately, such

a gear is to be selectively case-carburized and hardened for optimum performance and wear characteristics.

After rough machining of gear teeth and hub area, the gear is copper plated all over. Adhesion of the plate must be satisfactory. The recommended plating thickness for carburizing is 0.0007 to 0.001 in. This thickness provides adequate stop-off protection in gas carburizing atmospheres.

Close shave

After plating, the gear is ready for the finished shaving operation on the gear teeth. Shaving will remove the plate (along with some stock) from those areas to be carburized, especially the working areas of the entire tooth form including the land. The gear is then set for gas carburizing, the length of the cycle serving to control the depth of case.

For best results, the gear should be stripped after carburizing and

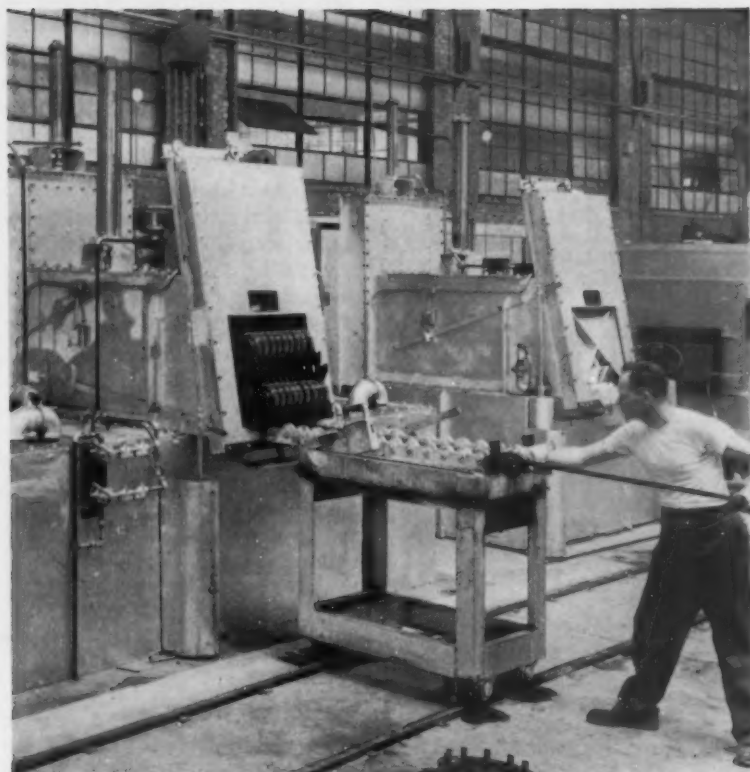


Photo courtesy of Surface Combustion Corp.

SELECTIVE carburizing of gears requires the use of effective stop-offs properly applied.

replated all over prior to hardening. Thickness of plate required for furnace hardening is about 0.0005 to 0.0007 in. To prevent oxidation of the copper plate, the hardening furnace must be provided with either a carbonaceous atmosphere that is slightly endothermic or a neutral atmosphere.

Similar procedures would apply equally well to a pack carburizing operation. It is important to note, however, that plated stop-offs are not always satisfactory in molten salt carburizers. Unless specifically recommended by the salt manufacturer, plated coatings should not be used.

Here, then, are two of the more significant disadvantages of electroplated stop-offs. They cannot be safely used in either oxidizing atmospheres or in media that are likely to attack the plate chemically.

Plated stop-offs have a number of noteworthy selling points, especially in mass production opera-

tions. But all of these advantages depend upon the availability of proper facilities, many of which are less likely to be found in smaller shops.

To fill the needs of those who cannot take advantage of plated stop-offs, a number of proprietary coatings have been developed. Among the leading manufacturers of these materials are The Glidden Co., Cleveland; National Copper Paint Corp., Chicago; Park Chemical Co., Detroit; and Solar Aircraft Co., San Diego, Calif.

Use paints

National Copper Paint Co. manufactures two distinct brands of proprietary stop-offs. They bear the trade names "Sel-Car" and "Sel-Nite." Both consist of a paste and a liquid thinner, and can be either brushed on or sprayed.

"Sel-Car" is made in four different varieties and should be used in accordance with the manufacturer's recommendations. In gen-

eral, however, these stop-offs are designed to prevent decarburization or carbon "pick up" and to eliminate scaling and oxidation of steels at elevated temperatures. They are used in forging and rolling operations as well as in heat treating.

Steels must be thoroughly cleaned before "Sel-Car" is applied. For selective carburizing, two coats of stop-off are usually recommended. A drying period of from 3 to 5 hours is required for each coat. Although both brushing and spraying produce satisfactory results, dipping is not recommended because it seldom produces an even layer of coating.

Just one coat

To prevent decarburization or scaling, only one coat of stop-off is required. In all cases, the mix must be thoroughly dry before entering the furnace if blistering is to be avoided.

One or another of the "Sel-Car" paints can be used safely in temperatures ranging from 1400° to 2400°F without protective atmosphere. The paints are said to have no deleterious effect on furnace hearths or other components. Removal of "Sel-Car" after heat treatment may require grit blasting, dipping in ammonium bifluoride, or a combination of the two.

"Sel-Nite" stop-off is intended primarily to prevent nitrogen penetration during selective nitriding. It is applied as a single coat and requires about 8 hours of drying time before entering the nitriding furnace.

Although designed for use at nitriding temperatures (975°-1,000°F), it will successfully withstand temperatures up to 1200°F for long periods of time.

Along with "Sel-Car," it is removed either by blasting, scratch brushing, or chemical dipping.

Park Chemical Co. is another producer of proprietary protective coatings for use in heat treating. Their "No-Carb" is a silicate-base paint containing copper fines and serves as a stop-off for selective carburizing or prevention of decarburization. It can be used during heating for rolling, forging, nor-

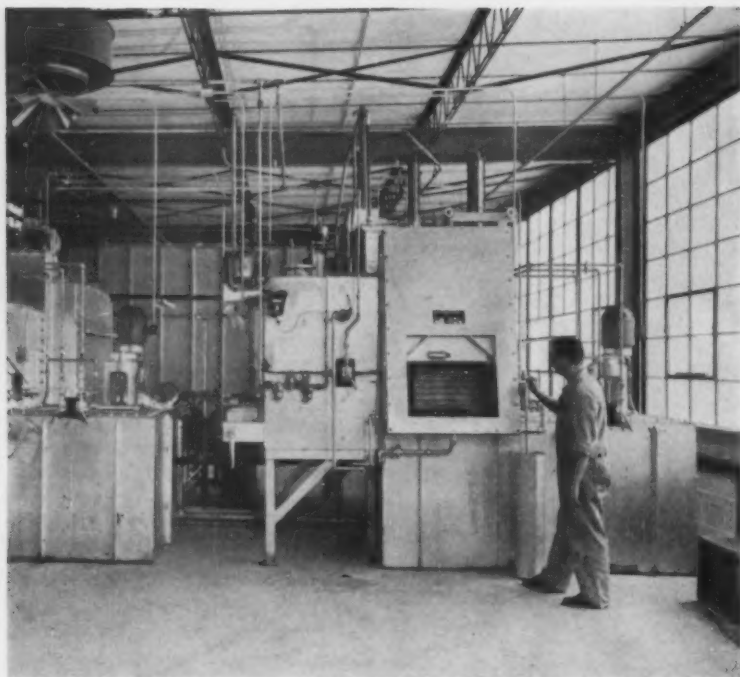


Photo courtesy of Surface Combustion Corp.

ALLCASE furnace provides for quenching under protective atmosphere to avoid decarburization.

malizing, annealing, or hardening. It should not be used in molten salt baths.

Either painted or sprayed, it dries within a period of 15 to 20 minutes. Two thin coats are recommended for optimum protection.

"No-Kase" is another Park product and is designed especially for selective carburizing. It is a mix of metal powders, mostly copper, and can be safely used in solid, liquid, or gas carburizers. Consisting of both pigment and vehicle, it can be either painted or sprayed. In both cases, thorough mixing is essential.

For nitriding

"No-Tride" is a proprietary paint stop-off containing powdered tin. It is recommended for selective nitriding in ammonia atmospheres. Since it contains a heavy pigment which settles out on standing, it is usually suggested that only enough pigment and vehicle be mixed to take care of immediate needs.

Like many of the other stop-off paints, "No-Tride" can be either painted or sprayed. It requires

about one hour to dry thoroughly under average atmospheric conditions. Removal may require blasting, scratch brushing, or chemical dipping—separately or in combination.

The Solar Aircraft Co. produces an unusual ceramic-type stop-off called "Brytaneal." Its principal function is to prevent surface oxidation, particularly at very high (1950°F) annealing or solution treating temperatures.

A few coats of "Brytaneal" ceramic are applied to parts before furnace treatment. These coatings are actually fired down on the base metal while the parts are being heat treated. After the parts are removed from the furnace and cooled, the protective coating spalls off leaving an oxide-free surface.

"Brytaneal" coatings have been developed for use on AISI Type 300 stainless steel as well as a number of the superalloys. Experimental coatings have also been developed for mild steels such as AISI 1010 and 1020.

Here, then, are some of the stop-off paints that can be substituted

for plated coatings. Whether or not they should be used in preference to plating is likely to depend upon a variety of cost factors, a study of available facilities and, most important, the nature of the parts to be treated.

On sheet metal assemblies, for example, removal of stop-off paint by blasting is very apt to be problematical. Removal of the same paint from a simple forging, on the other hand, may be comparatively easy.

Pros and cons

Similarly, where copper or bronze plating facilities are already available, use of plated coatings will not necessarily involve additional capital expenditures. If trained platers are also available, plated stop-offs may very well be a best bet.

Plating for heat treat stop-off purposes is still a rather finicky operation, however. It requires more care than most decorative plating applications. Excellent adherence and high density of the plated coatings are an absolute "must."

To be sure of getting the highest quality, stop-off plating cannot be safely entrusted to anyone but a fully qualified electroplater. This is a basic "ground rule" which many shops either fail to understand or prefer to overlook. Still, the higher labor costs entailed by resorting to a skilled plater are almost always justified in terms of scrap reduction.

On parts containing hidden recesses, internal areas that are hard to get at, proper plating may call for the use of conforming anodes. On small volume orders, the cost of such elaborate racking might well prove prohibitive.

All of which adds up to the fact that the choice of the best stop-off for any given job requires judgment. And judgment implies that most of the right answers are seldom, if ever, dogmatic.

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Modular Timer

Controls Many Functions

♦ MODULAR construction in a compact industrial timing mechanism makes possible its use in a long list of diverse metalworking applications. The unit can supply a wide variety of timing intervals and control actions for automatic process control, telemetering and similar mechanical or electronic equipment.

Powered internally

It operates without an external power supply. Yet dimensions of the device can be as small as 1¼ in. diam by 2 in long.

The timer consists of three cylindrical cartridges or modules. One cartridge houses the power supply, the second a timing mechanism, and the third a control unit, according to the developer,

Allied Products Div., Hamilton Watch Co., Lancaster, Pa.

Alternate cartridges to provide different timing functions interchange easily. The unit thus built up is actually tailored to fit the particular circumstances, if these are within the capacities of the individual modules.

Each power supply module houses a mainspring within its 1¼ in. diameter. Modules available as standard units can supply varying torques, and operate the timer for periods ranging from 1 to 192 hours.

The middle module is essentially a heavy duty watch. It is available in several standard movements providing time interval measurements from a few seconds to 168 hours.

The third module contains the control unit, comprising a cam driven by the power module and governed by the timing mechanism. This control can perform various functions, depending on the configuration of the module selected.

It can open or close electric circuits at desired time intervals. It can supply a powerful mechanical impulse to trigger another nonelectric device at the end of a predetermined time interval. In some designs the control module can delay triggering, or supply timed circuit control actions.

Resists shock

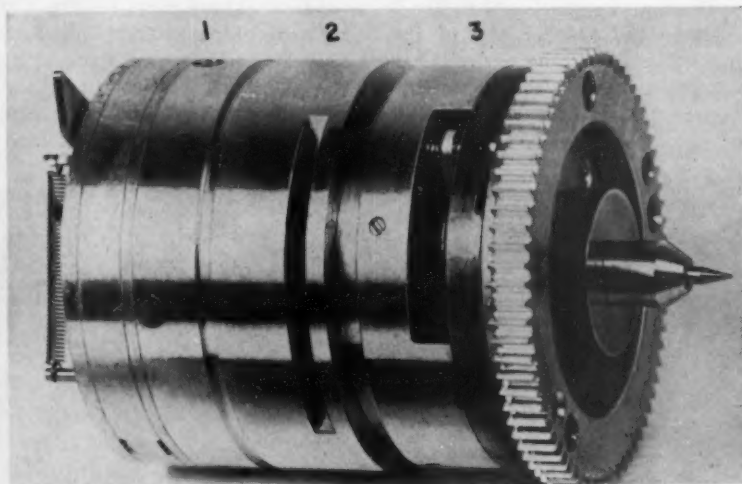
All modules and their assemblies will withstand high shock loading forces. They are designed to emerge undamaged from accelerations up to 3000 gravities applied for intervals up to 10 milliseconds.

The devices will time accurately within ± 1 pct from -65°F to $+165^{\circ}\text{F}$. They may be calibrated to time within ± 0.1 pct at any temperature within this range.

The high torque output of the power supply permits timing control of a number of electrical circuits. It can readily be adapted for remote control and for fail-safe operation.

By stocking a few standard forms of each of the three types of modules, various combinations of operating time, timing interval and control action can be obtained.

High speed rotation affects timer accuracy only slightly, if spun along its own axis.



INTERCHANGEABLE modules vary timing cycles to meet specific conditions. Cartridge 1 is power supply, 2 the timer, 3 the control.

How To Impact Test Sheet Material

By R. F. DOMAGALA, Research Metallurgist,
and H. L. NURNBERG, technician, Metals Research Department,
Armour Research Foundation, Chicago, Ill.

♦ IMPACT TESTS have not been applied to sheet material to any great extent, and apparently no effort has been made to establish a standard testing rig or standard procedure.

A device designed and constructed at Armour Research Foundation attempts to fill this gap. Simple in design and rather inexpensive to make, it mounts readily on a standard Sonntag pendulum impact tester. Figs. 1 and 2 illustrate the unit and test specimen in place on the impact tester.

Design new support

Fig. 1 shows details of the specimen support. A steel blank *A* replaces the regular base plate which normally holds a notched bar specimen. The two-part specimen support *B* mounts on the base plate with pins and screws *C*. The support adjusts in several positions to accommodate test specimens 3 to 6 in. long in increments of 1 in. In Fig. 1, *E* is the test specimen itself.

Specimens varying both in length and notch geometry have been tested, and modifications are permissible. Although all work at Armour has been conducted on specimens $\frac{1}{8}$ in. thick and 1 in. wide, variations here also are possible.

A $\frac{1}{4}$ -in. pin and setscrew (*D*) in

♦ One apparent lack in impact testing of sheet material has been standard apparatus for determining impact strength . . . Here is a relatively inexpensive rig that attempts to fill that gap . . . Repeatable values showing behavior of sheet under impact load may be readily obtained.

♦ Simple in design, the setup can test specimens of varying length and notch geometry . . . Standard or modified specimens may be used, depending on the particular circumstances . . . Specimens may be tested at either high or low temperature and resulting values can be considered significant.

Fig. 1) clamp on one end of the specimen. Through the $\frac{1}{4}$ -in. hole on the free end of the specimen, a two-part threaded pin *F* is inserted and tightened. Fig. 3 shows details of the pin.

The tup (hammerhead) in Fig. 3 replaces the regular tup of the impact machine. The new tup has a gap between the shoulders wide enough to clear the clamped end of the specimens. At the same

time, the gap is narrow enough to hit the pin at the free end of the specimen, rupturing the test blank. Energy absorbed by this action is indicated on the tester dial.

All machined parts for the test rig were prepared from AISI-SAE 4140 steel. Parts were machined to blanks, then hardened and tempered to about Rc 35 before final machining.

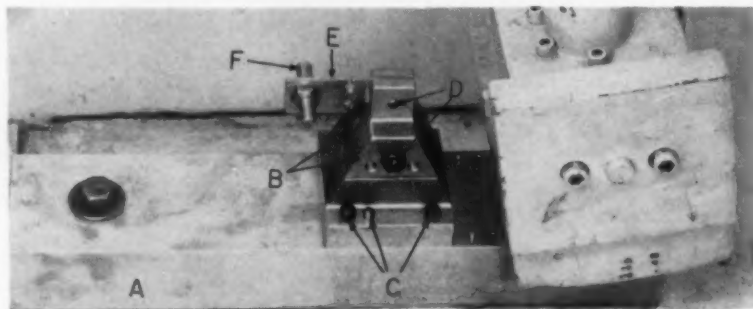
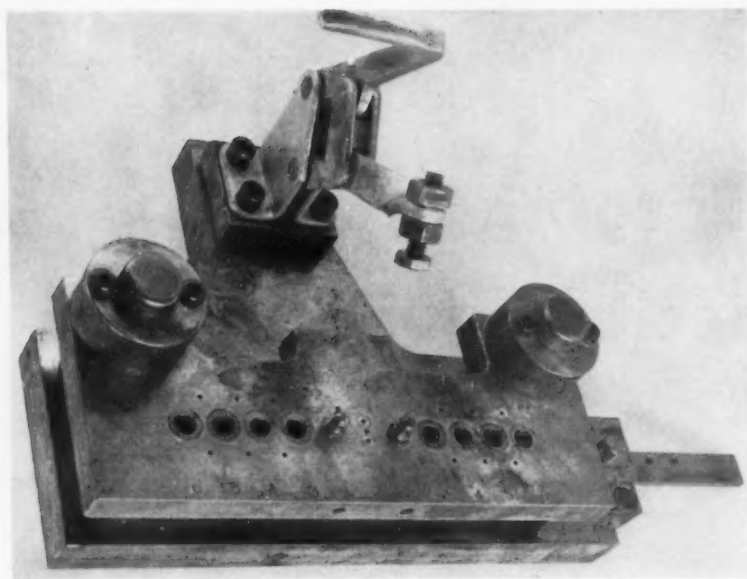


FIG. 1—Pendulum sweeps past specimen *E*, strikes pin *F* to rupture the test blank. Pins and screws *C* permit easy demounting of special anvil.



Specimens may be tested at elevated as well as sub-zero temperatures. For the lower temperatures, it is convenient to submerge the test specimen (already mounting its two-part pin) in liquid nitrogen. When the temperature of the material is equalized throughout, withdraw the test specimen from the cold bath. Transfer it to the fixture, clamp it rapidly in place and release the hammer.

Temperatures are measured by a copper-constantan thermocouple clipped onto the reduced section. The couple is removed just before releasing the pendulum. Several seconds are required to transfer the specimen and fix it in position, so the minimum temperature at which tests can be conducted with this technique is about -60°F .

Test hot specimens

For elevated temperatures, a simple heating element slips over the specimen and heats the test bar in place. Approximately 13 turns of 1/32-in. wide by 0.007-in. thick Nichrome ribbon are wound over a silicone glass cloth tape. Another layer of the same tape keeps the windings in place. Power to the heating element is supplied through a small Variac. A thermocouple beneath the heater element adjacent to the speci-

men's reduced section measures the temperature.

By manually controlling the Variac setting a range of temperatures can be maintained. Temperature limit of the silicone insulation is about 600°F . Higher temperatures are possible with modified heater design.

Prepare specimens rapidly

Fig. 4 shows a jig for rapidly producing test specimens. A $\frac{1}{8} \times 1 \times 3$ to 6 in. long blank clamps into the fixture, and the holes are drilled in place. Each specimen may be marked at 1-in. gage lengths so that elongation values may be measured and considered in evaluating test results.

Typical specimens prepared on this jig have double keyhole notches directly across from one another on opposite sides of the sheet specimen. Notches are located equidistant from the two $\frac{1}{4}$ in. clamping holes. Keyhole dimensions in specimens tested to date include those 1/64, 1/32, $\frac{1}{8}$ and $\frac{1}{4}$ in. diam.

In using this impact testing setup, naturally a special series of test values must be accumulated before any correlation can be attempted. Within the limitations of the technique, repeatable data regarding sheet behavior under impact loading can be obtained.

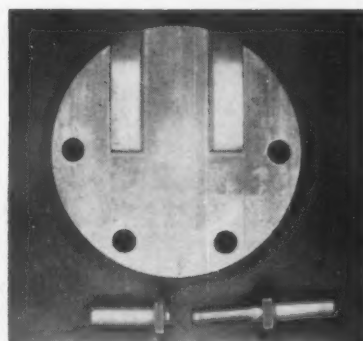


FIG. 3 — (Above) Modified tup (top) permits pendulum to pass one end of specimen, hit the other.

FIG. 4 — (Left) Jig enables rapid preparation of test specimens, marking at 1-in. gage lengths.

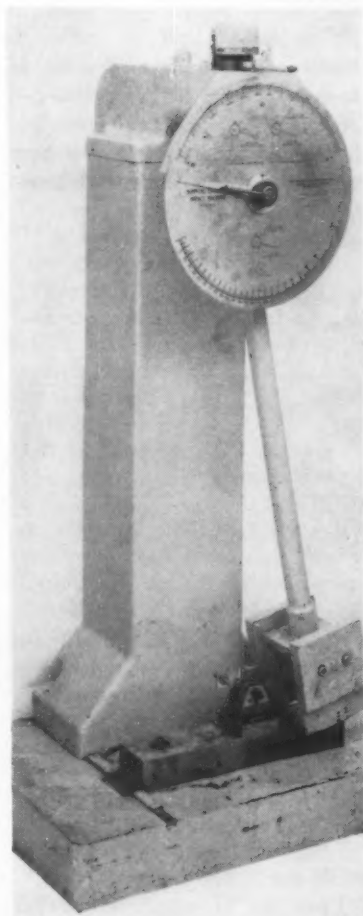


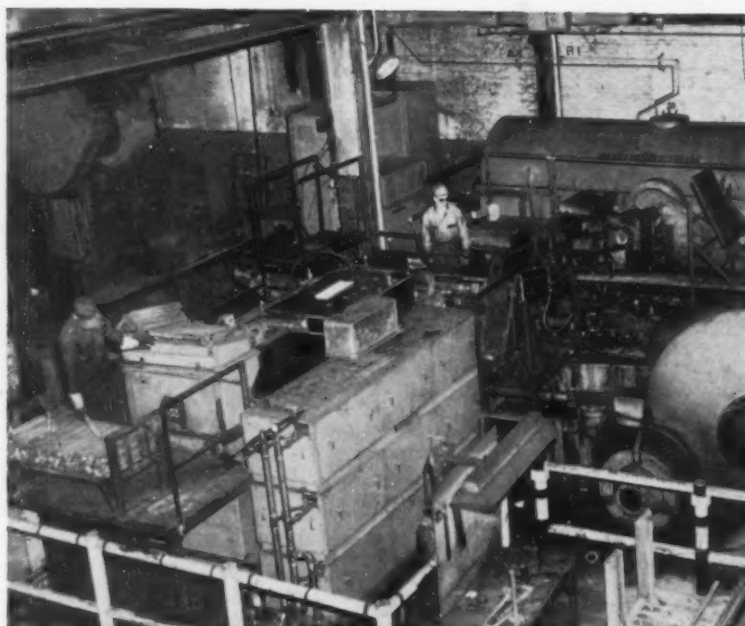
FIG. 2 — Standard impact tester adapts readily to test various specimens of sheet material.

Automate Forging Without Special Equipment

♦ Without investing in specially designed equipment, it's possible to automate a forging line . . . One plant increased production from 135 to 400 completed forgings hourly by automating its five-step upsetting operation.

♦ This forger built an automatic loading and transfer mechanism, integrated it with his present forging equipment . . . Barstock feeds into furnace continuously, moves through a five-cavity die, emerges trimmed for later work.

By HERBERT CHASE, Consultant
Forest Hills, N. Y.



BARSTOCK for forging moves continuously and automatically from hand-fed magazine (left) through induction furnace and into the five-cavity forging die (right). Shafts drop from die ready for final operations.

♦ **FORGING** can be automated without going into equipment of special design. By mechanizing loading and handling on a standard upsetter, one plant boosted output from 135 to 400 forgings hourly. The workpiece descends automatically through a five-cavity forging die, which upsets, tapers, punch-forms and trims the part.

Upsetting of output shafts for automatic transmissions is one of several large volume forging operations at the Oldsmobile forge plant in Lansing, Mich. Until recently,

this upsetting was done conventionally. An operator moved the heated AISI-SAE 5150H barstock by hand down through the five-impression die in a standard upsetting machine.

The manual handling called for relatively slow, tedious, hot and tiring work. These conditions showed up in an average output of about 135 forgings an hour. The rate was attained with one man transferring heated 1½-in. diam bars from the furnace to the upsetting operator.

By automatically feeding bars to the dies, and mechanizing transfer of forgings from cavity to cavity, the forging rate obviously could improve. In addition, proper design would permit upsetting two steel workpieces in one die at the same time.

Essentially, the mechanism added to the standard forging equipment consists of a pair of vertically-mounted tongs, and the means for operating them automatically. Five recesses in each tong jaw mate on closing to hold the 1½-in. diam

barstock. Tong indentations are spaced on 7½-in. centers to match the five die cavities.

The tongs suspend and pivot on a horizontal pin inserted through a rocking link moved by a cam. Tong jaws move up and down within a vertical slot in the die. The slot is cut deep enough in each die half to permit opening the tongs while the die is closed.

In operation, the forging setup can work continuously. After the die closes, the rocking link automatically lifts the tong jaws 7½-in. At the upper end of this stroke, the jaws close and grip a heated workpiece in the top hole of the five thus formed.

At the same time, the tongs grasp another chrome alloy steel bar being forged lower down in the die. The end of this in-process workpiece projects from the die cavity. The opposite end of this bar has already been partially upset in the prior die closing.

Transfer automatically

At this point, the multi-cavity die opens and the closed tongs descend 7½-in. This moves the partly forged workpiece from one die cavity to the next beneath. Tong jaws hold both chrome alloy workpieces until the die closes. The tong jaws again open and move up to repeat the cycle.

When the die opens on the following cycle, a finished forging drops from the lowest cavity. The upset workpiece then in the second die cavity is held there by the closed tongs, and lowers one space when the die opens fully.

The loading and transfer mech-



ROCKING linkage (top) moves workpieces successively down through five-cavity forging die (center).

anism introduces a new steel workpiece every third cycle. Thus on one closing, only the first and fourth cavities contain workpieces. At the next closing, these recesses are not loaded, but work is done in the second and fifth cavities. On the third closing, only the third cavity contains a workpiece.

Upsetting is done and a taper forged in the upper two cavities. In the third and fourth die cavities, punches form the sizeable recess required in the end of the forging. In the fifth position, a trimming operation completes the chromium alloy steel workpiece. The forging and the trimmed flash fall out when the die opens on every third stroke.

Heat by induction

To keep pace with the forging, barstock must heat and feed at a corresponding rate. Steel bars are 24⅜-in. long, but only 15½-in. needs heating. After feeding in from a hand-loaded magazine, bars heat by induction as they advance through a slot into a Westinghouse induction furnace.

Heated bars at forging temperature roll into a trough on issuing from the furnace. A pneumatic

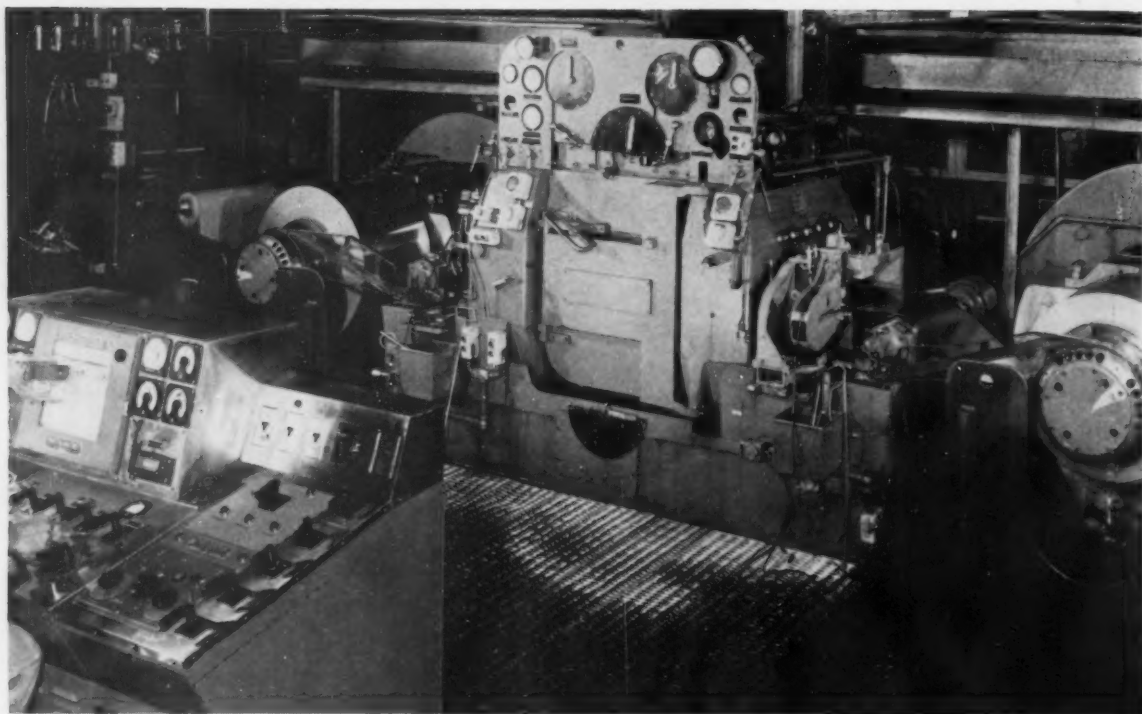
plunger synchronized with the die motions pushes the bar between the tong jaws and into the die. The six-inch upsetter normally runs continuously.

Except for the automated tongs and the operating mechanism, the upsetter is standard. Dies have the same cavities used for the earlier hand fed and transferred forging work.

Need for vertical slotting to accommodate the tongs weakens the dies. Initially, this led to some decrease in die life, and made necessary more frequent redressing of dies. Means for overcoming this trouble have been found, and useful die life increased.

In the prior setup, an upsetting operator and his helper could produce 135 forgings an hour with manual transfer. Two men run the new setup. A third man supplies stock to the operator feeding the furnace magazine, and also removes completed forgings. The higher output more than offsets the increased manpower required.

Production proceeds at more than six completed forgings per minute, under considerably improved working conditions.



MILL'S control board (left) keeps all instrumentation within operator's reach and view.

Tight-tolerance rolling—

Mill Setup Controls, Records Strip Thickness

♦ Rolling 0.005 to 0.040-in. thick alloy and stainless strip calls for close control . . . This mill gets it—automatically—with a new setup that gages thickness, makes tiny adjustments and prints a record of the entire coil.

♦ Features of the system include Xray gages and automatic control of both screwdown and back tension . . . All control components are within easy reach of the mill operator . . . Electronic gear is out of the way—but accessible. Setup is highly efficient, produces better strip at lower cost.

♦ A NEW automatic control, gaging and production analysis system, integrated with a 26-in. Sendzimir reversing mill, controls output thickness of alloy and stainless steel strip within tolerance limits of 0.001 to 0.002 in. Installation is at the Wallingford Steel Co., Wallingford, Conn. Bulk of the strip rolled on the firm's Sendzimir mill is within a thickness range of 0.005 to 0.040 in.

Final form of the control system evolved as a result of close cooperation between research and engineering staffs of Wallingford Steel and the Pratt & Whitney Co., West Hartford, Conn. Latter firm furnished all of the gages and controls. Some were standard, while others were engineered to the customer's requirements.

Standard equipment includes P&W X-ray gages, an automatic screwdown control and a recently developed production analysis card printer. An automatic back tension control was developed specifically for this installation, and the mill operator's control desk was also tailored to the customer's needs.

Controls grouped handily

As an accompanying photograph of the complete control setup shows, every effort was made to keep control desk equipment at the operator's fingertips. Bulky electronic gear is kept out of the way but still readily accessible for servicing.

One of the first problems in designing the installation was to provide an accurate means of measuring strip thickness. Because contact gages were considered objectionable due to roll wear and strip marking, non-contacting X-ray type gages were chosen. (Ordinary thickness range of the strip prohibited the use of pure Beta-ray equipment.)

The two P&W continuous X-ray gages are calibrated for an overall thickness range of zero to 0.075 in., and are modified to gage in this range to an accuracy of 0.0001 in. They are mounted on the drive side of the mill and have retractable gaging heads so that they may be removed easily at any time their removal is desired.

The control operator makes de-

sired thickness settings on his control panel to within 0.0001 in., using both a "coarse" and a "fine" dial. A deviation-type indicating meter shows him how near to nominal thickness is the strip being produced.

To actually roll strip to the closest possible thickness tolerance was still another problem. Solution was to incorporate a screwdown control and a back tension control (both automatic) into the overall system.

Screwdown unit uses the jogging or on-off principle wherein the "on time" correction is proportional to the amount of error signal and the time between jogs is determined by the speed of the strip. The unit is activated by a signal from the mill drive indicating that it is running above thread speed.

"Up" and "down" limit controls on the operator's panel establish the points of gage deviation at



PANEL contains "up" and "down" limit controls, also dials for setting thickness required.

which the automatic screwdown control begins to function. Actually, these points determine the so-called "dead band" in the system, wherein no screwdown control is made.

A comparison unit automatically controls back tension within predetermined limits. It varies strip thickness minutely for continuous, closed-loop, null balance control within the "dead band" established on the screwdown control. The tension control unit electrically positions a motor driven rheostat and adjustment is brought about as a



DIRECT reading recorder prints continuous record of strip thickness throughout the coil.

result of minute variations in strip thickness.

A third major problem was to obtain a permanent record of how closely the strip material actually conformed to target thickness. Solution to this was the use of a production analysis card printer, which comprises a direct reading thickness recorder; "oversize," "on-size," "undersize" and total footage counters; and a production analysis card printing unit. Chart of the direct reading recorder is selsyn driven from the main mill drive and is proportional in length to the strip produced, regardless of mill speed. The chart indicates exact location of any thickness peculiarities within a coil.

Custom-fitted systems

Automatic control and gaging systems such as this are quite new and specialized. Each application must be especially engineered so that the equipment will perform to the customer's particular standards. However, installations not unlike the one at Wallingford Steel can be applied to multiple stand tandem mill operations; single stand, single direction mills; and reversing mills of almost any size and shape.

The highly efficient setup insures that the mill will be able to meet the ever-increasing demands of its customers for better products. Moreover, it makes certain that rolling mill production yields not only a better product, but one that can be produced at a lower production cost.

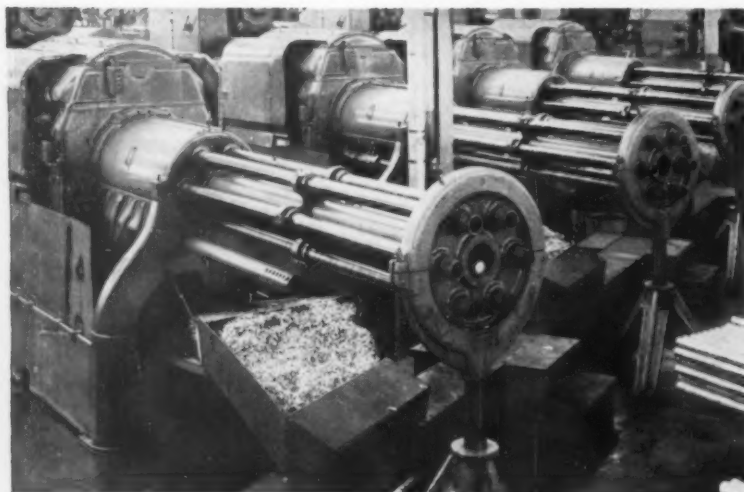
Handle Chips Efficiently For Greater Shop Profits

◆ Sometimes it pays to process chips and turnings before disposal . . . Crushing, providing means for removing cutting oil are examples . . . Efficient systems permit recovery of up to 100 gallons of oil from each ton of chips handled.

◆ Setups differ for such prior-to-removal processing . . . Sometimes crushing is practiced without oil extraction, sometimes extraction without crushing . . . Here's a rundown on system components for processing chips, turnings.

By J. E. HYLER, Consultant, Peoria, Ill.

Part 3



Link Belt Co.

FLOOR-MOUNTED, this long screw conveyor (running up diagonally from bottom center) serves battery of six-spindle automatic screw machines processing aluminum mortar fuses. Note chip-filled feed inlets from each machine.

◆ IT PAYS to have a chip handling system serve a dual purpose. The primary consideration is to get chips and turnings out of the way of men and machines expeditiously. But simple removal should sometimes be supplemented by means for "beneficiating" scrap to increase its salvage value.

Chip crushers and oil extractors are among these means. Efficient oil extraction systems permit recovery of up to 100 gallons of oil for each ton of chips handled.

Normally, the sequence is for chips to go through crushers first, then to the extractors. But sometimes chips coming from small capacity screw machines and other units are fine enough so that they require no preliminary crushing. It may then be good economics to arrange a conveyor system to gather chips and take them directly to the centrifuge.

This is particularly good with various nonferrous chips. The plant of York Gears, Ltd., in Toronto offers a good example. Here, aluminum mortar fuses are produced in large quantities to close tolerances, on six-spindle automatics. A screw conveyor serves a battery of machines. A special type of inlet to the conveyor is provided at each machine.

Sometimes chips are crushed simply to allow a larger volume to ship in a given amount of space, but oil is not extracted.

In such instances, chips may be chuted from the crusher to a pit, from which they can be picked up directly by a bucket elevator. Or they may be chuted onto an apron conveyor which carries them to the bucket conveyor.

Stored in bins

In either case, the usual arrangement is to lift and deposit them by bucket conveyor into high storage bins, adjacent to the shipping track.

Where both crushing and oil extraction are part of the process, chips go from crushers into an oily hopper. They then transfer from this oily hopper or holding bin to the oil extractor at whatever rate the extractor can accommodate them. Some systems convey chips to the oily hopper

pneumatically, and the hopper vent is equipped with an electrostatic oil mist collector.

This removes oil vapor from air recirculated into the building after passing through the pneumatic conveyor.

Other chip-handling systems interpose a so-called surge hopper between the crusher and the pneumatic system which passes the chips to intermediate storage. This collects and converges chips to pass through the discharge opening of the hopper. At the same time, it insures that chips will pass through the subsequent pneumatic system at a definite rate of flow.

Some types of chips pass through crushers more rapidly than others, largely due to variations in ductility of turnings. In other words, there's a difference in rate of flow from the crusher.



CLOSEUP shows details of inlet from machines to longitudinal screw conveyor. Short auxiliary conveyor brings chips to inlet point.

The surge hopper compensates for this, feeding crushed chips at a uniform rate.

A vibrating-type feeder is employed to provide this metered flow of chips to a pneumatic conveyor system. While volume of air passed through the fixed diameter pipe of these systems could be varied, it's been the practice to design for a fixed air volume and, hence, fixed velocity.

Air volume and pipeline velocity, of course, determine the maximum quantity of chips of any given weight that can be handled.



DeLaval Separator Co.

OIL EXTRACTORS like this link-suspended type unit handle large loads of crushed chips and turnings fast and effectively.

Hence the importance of metering chip flow.

Pneumatic systems used are under continual pressure, ranging from 1 to 5 lb. Specially designed air locks permit feeding chips at atmospheric pressure into this higher pressure air stream without any blowback. This rotary air lock is sometimes called an ejector. Once in the air stream, chips are carried through the pipeline at high velocity, discharging into a crushed chip surge bin where they fall to the bottom.

Chip wringers or oil extractors are often of the batch type, though continuous wringers are employed in some advanced systems.

Batching and weighing devices for measuring up loads of chips for batch-type oil extractors are readily available. One firm produces such extractors in four sizes, ranging from 20-in. bowl diam to 48-in. All operate by spinning chips at high speed, so the oil they contain will be thrown outward and upward by centrifugal force.

Drain all sizes, shapes

Differences in bowl diameters mean far more in capacity than one might suppose. Capacity of the 20-in. bowl for instance, is 1.5 cu ft, while the 48-in. bowl's capacity is 16 cu ft. These separate oil efficiently from all sizes and shapes of chips and turnings.

Centrifugal force exerts tremendous drainage power on the

cutting oil. Forces on chip-loading baskets spinning in these extractors may be anywhere from 250 to 350 times the force of gravity alone.

It follows that even were extensive periods of draining oil into settling tanks feasible (and they seldom are), most of the oil would still be retained by the chips. Hence, extracting oil has another advantage besides just the value of the oil saved. Since reclaimed oil can be processed immediately and re-used, centrifugal extractors allow a great reduction in the inventory of cutting oil the plant must keep on hand.

Reduces fire hazard

Greatly lessened fire hazard is another argument for extractors, especially where kerosene is used as a coolant.

On one excellent wringer, the centrifugal basket lid fits over a threaded top on the driving spindle and locks on the basket. The spindle nut is then screwed down, a safety cover lowered, and the machine starts.

As the basket comes up to speed, cutting oil flows up the outward sloping sides to a collecting drain.

Baskets of the usual batch-type chip wringer may be loaded by shoveling chips in. Or chips can be dumped from tote boxes or other containers or fed from a chute. Sometimes two-pronged special lifting hooks are furnished on the basket. A chain hoist then permits loading the basket into the machine.

Chromium Plate Irregular

By LOUIS ROSENBERG, President, Simmons Plating Works, Inc., Atlanta, Ga.

◆ Anodes closely adjacent to the plating surface contribute to the highly uniform plating thicknesses possible on the irregular contours of gun tube bores . . . Higher amperage and bath temperature help also. Current in the chromium plating bath runs more than three amp per sq in.

◆ Internal chromium plate is uniform, very bright, without surface irregularities or cracks through to basis metal . . . This despite thicknesses in excess of 0.005 in. on the grooved face . . . The plated film can run as high as 0.007 in. thick, under special circumstances, without porosity.

Major concern here is uniform chromium thickness on both lands and grooves of gun tube workpieces. Rifling on 75mm gun tubes drops sharply away from the land surfaces to form grooves spiraling around the bore about $\frac{1}{4}$ in. wide and more than $\frac{1}{8}$ in. deep. Rifling depth in 90mm gun tubes also chromium plated exceeds $\frac{1}{8}$ in. Both external and internal corners of rifling are broken to rounding radii of less than 0.020 in. prior to plating.

◆ GETTING good throwing power with chrome plating solutions can often be quite a problem. On irregular workpieces, it makes the job of controlling plating thickness more difficult. Yet such control can be and is achieved in production.

Under proper shop conditions, chromium can be electroplated very uniformly in thickness 0.005 in. and greater, regardless of

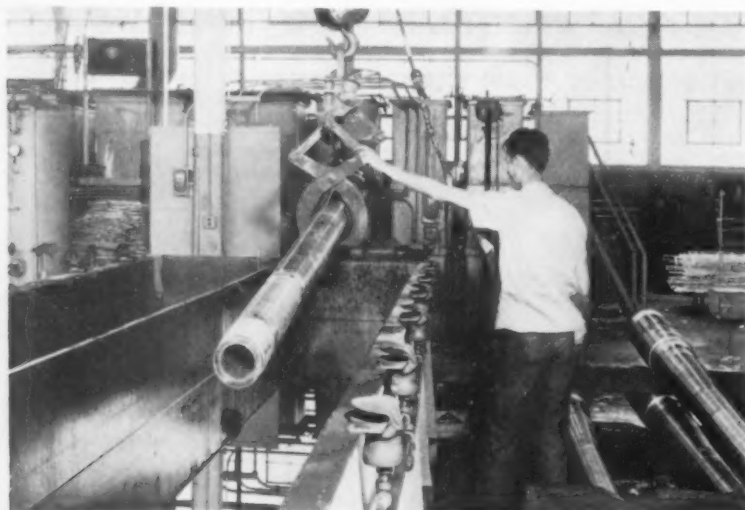
varying part contours. The heavy coating can be plated to a very bright surface without trace of burnt, frosty, milky or off-color deposits. Surface hardness under the same conditions can exceed 950 Bhn. The chromium as plated shows no surface irregularities under boroscope examination throughout the 15-ft. workpiece length, and is free of cracks penetrating to the basis metal.

Some difficulties expected

Normal experience in chromium plating such irregular workpieces would indicate: (1) Chromium thickness on lands should average substantially greater than in grooves. (2) Internal corners should plate lightly, and the resulting chromium deposit there may be milky and relatively soft. Both conditions can come about through a current density that differs from one workpiece surface to another, due to varying contours. Lacking corrective measures, current density on land surfaces will exceed that found in the grooves and at internal corners.

Overcoming these problems isn't simple. But the answer involves no one technique not fairly common practice in production chromium electroplating. Perhaps the favorable combination of techniques led to satisfactory results in this case.

Setting up favorable plating conditions here requires: (1) controlled cleaning, rinsing, etching and plating bath conditions, (2) higher than normal etch and plating bath temperatures, (3)

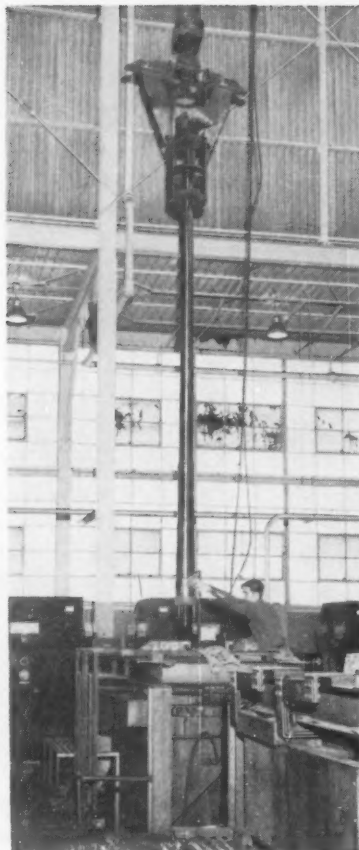


NOTE rifling in gun tube bore, which can give trouble in chrome plating to uniform thicknesses.

Surfaces Uniformly



AUTOMATIC vapor blaster hones bore surface with abrasive slurry in 20 minutes.



GUN tube lifts from reverse chrome etch tank ready for 0.005 in. thick chromium plating.

higher than normal current densities, (4) a specially designed anode, (5) use of "robbers," auxiliary metallic conductors to bleed off excess current from areas of abnormally high current density, (6) close attention to preparation of gun tube bore for plating, and (7) design of workpiece, within performance limitations, to result in final as-plated contours within tolerances.

Avoid design changes

This last is resorted to only when other approaches do not fully satisfy requirements. Since gun barrels for artillery pieces are manufactured to rigid U. S. Army Ordnance specifications, such changes require specific deviations from the contract.

Gun tubes 15 ft long and weighing up to 1525 lb each ar-

rive from Wheland Co., Chattanooga, Tenn. A double dip in mineral spirits strips the corrosion-preventive compound. The 28-ft long degreasing tank, partitioned along its length, provides two compartments used for initial and final cleaning. The entire process takes two to three minutes, plus draining time.

Visual inspection of the gun tube interior surface follows. Examination by Gurley boroscope reveals unacceptable surface defects, if present. Operators normally take about 10 minutes for this job.

Internal dimensions are checked with a star gage to determine necessary thickness of chromium to be plated. Causes for rejection at this point include undersize, incorrect bore taper and rough base metal. Slightly oversize bar-

rel bores may be plated thicker to meet final drawing tolerances, under certain conditions.

Powder chamber, tapered forcing cone and centering cylinder are plated in 75mm gun tubes, in addition to the bore. This calls for a careful watch on dimensional variations along the tube length.

Liquid honing prepares the bore surface for plating. The liquid emery-water slurry, pumped through a traveling nozzle, vapor blasts the entire bore from breech to muzzle and back again. A hose rinse removes the slurry at the end of the 20-minute operation. The equipment includes a self-contained filtered exhaust system with automatic filter washing. It also provides a manual station for washing small parts.

A chromic acid dip prevents rusting of the gun barrel while



ANODE inserted into gun tube bore fits tightly. Cathode fixture holds tube, conducts current.

awaiting plating operations.

On entering the high bay area, the gun barrel is raised from horizontal to vertical position. It continues in vertical position throughout the plating process.

First a lifting nut, then cathode-anode fixtures are attached to the muzzle end. Insertion of the anode in the bore follows. Attachment of a guide fixture at the tube breech and a cathode fixture to the muzzle completes preparation. The cathode fixture holds the entire weight of the gun tube, and conducts current for reverse etching and plating.

Etch before plating

A separate reverse chrome etch bath before plating helps assure a tightly adherent chromium deposit. The plastic-lined reverse chrome etch tank measures 6 x 4 x 30 ft deep. Solution temperature is controlled by heat exchangers to $135^{\circ}\text{F} \pm 2^{\circ}\text{F}$.

The anodic etch treatment takes three minutes and consumes 4500 amp at 8 v. The etch solution contains 33 oz per gal chromic acid, and 0.33 oz per gal of sulfate in the form of sulphuric acid.

The tube is then transferred directly to one of two plastic-lined chromium plating tanks, each 10 ft long by $3\frac{1}{2}$ ft wide by 30 ft deep. Udyllite Corp., Detroit, supplied etch and plating tanks, as

well as temperature controlling and auxiliary equipment.

Chromium electroplates on both 75 and 90mm gun tubes at a rate of 0.00125 in. per hour. This is equivalent to plating 0.0025 in. per hour on the bore diameter.

Current is 4500 amp, 6 v on 75mm gun tubes, and 4800 amp, 6 v on 90mm barrels. This figures out to more than 3 amp per sq in., higher than normal for chrome electroplating. Plating time runs from $3\frac{1}{2}$ to $4\frac{1}{4}$ hours, depending on the as-received bore dimensions.

Heat exchangers plus thermostatic equipment control plating solution temperature to $140^{\circ}\text{F} \pm 2^{\circ}\text{F}$. A chrome storage tank 10 x $3\frac{1}{2}$ x 30 ft deep is available for emergencies. Solution makeup is identical to that of the reverse chrome etch bath: 33 oz CrO_3 per gallon, and 0.33 oz per gal of sulfate catalyst.

Rate of deposition in the plating bath runs higher than normal. Maximum amperage and the close fit of the anode within the tube bore make this possible. The 90mm gun tube is roughly $3\frac{1}{2}$ -in. bore diam, and the appropriate anode more than 2 in. diam. Thus throughout the 15-ft length, clearance between anode and bore runs less than $\frac{1}{2}$ in.

Held top and bottom

Anode rigidity, despite its 15 ft length, lies behind the close fit. A guide fixture at the breech end controls movement at the lower end of the anode. An insulated section in the bridge fixture helps center the anode there.

One key to the success of the plating process can be found in the special anodes. Designed specifically for each size gun tube, they run the full length of the bore. The anode is steel, first electroplated with copper, then clad thickly with lead containing 6 pct antimony. No mechanical or chemical stopoffs are necessary to prevent deposition of chromium on the gun tube exterior.

A cold water rinse in a tank 4 x 4 x 30 ft deep completes the plating operation. Air agitation helps strip the last traces of chromic acid from the bore.

After removing the fixtures,

operators lower the gun tube to horizontal position for inspection. Rough plating, undersized bore and excessive taper are among causes for rejection.

Initially in plating these workpieces, the necessary bright deposit and film thickness gave some trouble. Occasional milky or burnt deposits were traced back to variations in the bath temperature. Proper temperature control has eliminated any off-color plating.

Thickness within 0.002 in.

Plating thickness on rifling lands still runs slightly thicker than in grooves. But on either groove or land, thickness remains uniform within 0.002 in. throughout the gun tube length. Throwing into groove corners has proved no problem.

Test firings and other data indicate the plating has negligible effect on the stress and fatigue properties of the gun alloy steel material. Some tubes are cast and others forged. Embrittlement due to hydrogen absorption in chromium plating has been evaluated as a potential problem. Hydrogen removal by heating has been considered.


Reverse chrome etch tanks and two chrome plating tanks work off ten 9-v rectifiers, each carrying 6000 amp. The 60,000 amp total has proved sufficient for all gun tube plating needs.

Following acceptance, gun barrels are reshipped to the assembly point. Artillery pieces are test-fired 3 to 9 times each before final acceptance.

Effect of plating on service life of gun tubes has been impressive. Gun bores hard faced with chromium electroplate withstand wear and the erosive influence of the hot, burning gases far better than unplated bores. The result is more rounds of ammunition fired per barrel.

It is understood that the process has been studied by several foreign governments, under the auspices of Aberdeen Proving Ground, and that it has already been adopted by a few.

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Anthony Lucas

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New Technical Literature:

Catalogs and Bulletins

Technical data

Technical data on hand forgings answers questions of designers, engineers and purchasing agents seeking the high-strength, low-weight advantages of aluminum for parts of limited production. The 16-page, two-color booklet is well illustrated with 30 photographs and drawings. Available by writing on company letterhead to: Room 787, Alcoa Building, Pittsburgh 19, Pa.

Metal forgings

Design, properties and applications of brass, bronze and aluminum hot-pressed forgings are treated in a new 32-page booklet. Featured is a discussion of design factors involved in specifying and producing forgings. Factors of strength, core size, flash line, projections, staggered lines, fillets, lettering, dimensional tolerances, and other problems are treated. A complete list of forging terms is included. Available by writing on company letterhead to: Dept. B, Customer Service Div., Titan Metal Mfg. Co., Bellefonte, Pa.

Chain couplings

Completely revised, a 16-page, flexible chain coupling catalog includes specifications, dimensions, ratings and application on silent chain couplings and roller chain couplings. Pertinent information is also tabulated on stamped steel covers, plastic covers and split aluminum covers. Morse Chain Co.

For free copy circle No. 1 on postcard, p. 153

Fan series

A new catalog contains information on a series of airfoil blade fans. It says the fan performs at 92 pct mechanical efficiency, and is suitable for forced draft as well as industrial air moving service. Buffalo Forge Co.

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FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 153.

Steel shop equipment

Work benches and shop equipment of steel are listed in a dozen-page catalog. It illustrates and gives style number, length, depth, height and sizes of this equipment available from one company's complete line. A wide variety of benches and related items are listed for virtually all shop applications. Parent Metal Products, Inc.

For free copy circle No. 3 on postcard, p. 153

Boss fittings

SAE boss fittings and "O" ring adapters designed to satisfy the new SAE straight thread boss standards are shown in a new company catalog. A complete line of these new adapters is offered in a wide range of sizes and styles. Also listed are new anchor tube nuts, available in short nut, SAE long nut and three-piece assembly styles. Anchor Coupling Co., Inc.

For free copy circle No. 4 on postcard, p. 153

Temperature controls

Temperature controls are described in a new six-page catalog. It gives physical specifications, performance data, temperature ranges and other pertinent information about a company's precision thermostats. Also listed are modifications and special features, such as moisture-proof seals, armored cable, extended shell, temperature-setting knob and dial, etc. Fenwal Inc.

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Tubular parts

Up-to-date information on tubular parts and fittings is contained in a new folder. It includes technical information on pipe, tubes, and welding fittings. A popular, proven, and widely used intermediate chromium molybdenum alloy steel for elevated temperature service is extensively covered. *Tubular Products Div., Babcock & Wilcox Co.*

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Marking machine

Hydraulic marking machines are covered in a new folder. Diagrams and case histories describe a unit which makes marking a production line operation. Legends in a wide variety are stamped on flat, round or curved surfaces in seconds with it. Uniform hydraulic pressure assures impression depth uniformity throughout long production runs. *Parker Stamp Works.*

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Welding rod

An informative welding rod comparison chart details the physical properties as welded, gives analysis, tensile strength, elongation and average Rockwell hardness. It lists typical uses of gas welding rods, bare electrodes, automatic welding wire and metal spray wire. Comparisons between the publisher's products and virtually all competitive makes are listed. *Page Steel & Wire Div., American Chain & Cable Co.*

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Cooling towers

Twenty-four sizes of quiet-operating cooling towers for business and industry are described in a dozen page booklet. It explains how the "whisper-quiet" performance of the fans is due to tip speeds of 2300 fpm. Squirrel cage blower, motor and drives are located in the dry air stream. No moisture laden air penetrates this vital mechanical equipment in the cooling tower, it is stated. Dimensions and approximate weights are given for each of the 24 cooling towers which range from 5 to 360 tons of refrigeration. *Cooling Equipment Div., Binks Mfg. Co.*

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This Quick Demonstration At Your Desk Will Prove How To Get Better, Economical Fastening With Townsend Lockbolts

A few minutes of your time invested in watching a simple demonstration of a better fastening method may point the way to savings of thousands of dollars in assembly of your products. The Townsend lockbolt provides a quick method of producing tight, rigid fastenings that cannot loosen even under extreme vibration or shock conditions.

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You will be able to see why the clamping action, or clinch, of Townsend lockbolts is higher than rivets—is more uniform than bolts and nuts. The demonstration will explain how the lockbolt fills the hole better than other fasteners—makes possible a more rigid joint and provides an effective liquid seal.

Townsend lockbolts are available in steel and aluminum alloy, in $\frac{3}{16}$ ", $\frac{1}{4}$ ", $\frac{5}{16}$ " and $\frac{3}{8}$ " diameters, in grip length ranging up to 2", in various head styles.

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Materials handler

Gas-powered and electric-driven, a new fork truck is described in a brochure now available. The truck has a load capacity of 10,000 lb with a load 48-in. long. Combining the advantages of gas and electric power, the truck's power plant consists of a gasoline engine powering a generator which, in turn, powers an electric drive motor. This eliminates the necessity for battery charging, yet retains the economy and simplicity of electric power. No transmission or gear shifting is required. *Automatic Transportation Co.*

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Radiography

X-rays for industry are covered in a dozen page booklet. Operating and application data on six different types of radiography units is included. Instruments include: 60 Kvp lightweight portable radiographic fluoroscopic unit, 160 Kvp dual-port unit, 160 Kvp 360 degree circumferential port unit, 150 Kv constant potential unit, 300 Kv constant potential unit, and 260 Kvp self-contained portable unit. Information is given also on industrial image intensifier and closed-circuit television installations. *North American Philips Co., Inc.*

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Colloidal dispersions

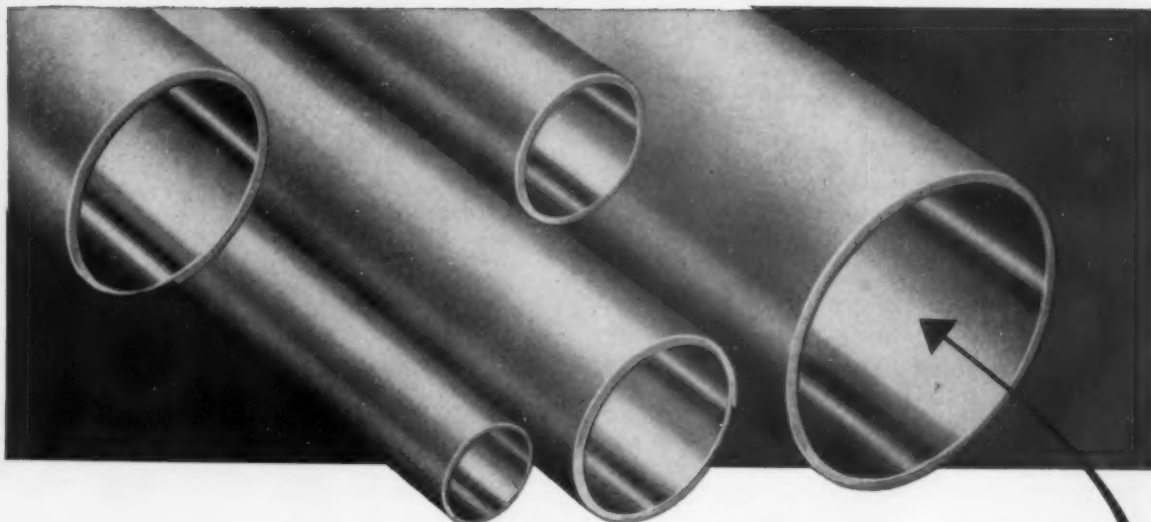
Current uses of colloidal dispersions in metalworking and related industries, is covered in several items appearing in a company publication. It describes how a plating department solved a dangerous problem. Also included are items on automotive and handling applications. *Acheson Colloids Co.*

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Research, development

A brochure describes the nature and scope of the diversified research and development programs conducted by one company. As the organization has grown, they have found the range of scientific activities and products requires more specific definition. *American Machine & Foundry Co.*

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J&L cold drawn **ELECTRICWELD** tubing now available with a superior **SPECIAL SMOOTH** I.D. finish

Reduces your over-all production costs in applications like these . . .

- cylinder tubing
- hydraulic and pressure tubing
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This new drawn-over-mandrel grade tubing with its mirror-like inside surface finish is today busy helping manufacturers reduce or entirely eliminate costly machining on many

applications and is being substituted for more costly types of steel tubing. For example, it may be used, without inside honing, for many cylinders through which plungers are passed.

J & L Cold Drawn **ELECTRICWELD** Tubing with a *Special Smooth* ID finish combines the physical advantages imparted by today's modern electric welding techniques with those of cold working. It withstands high internal hydrostatic pressures, carries heavy torsion loads, resists high-frequency vibration, and offers a favor-

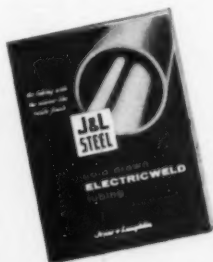
able weight-to-strength ratio for applications in which loading occurs in all directions.

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FREE TECHNICAL LITERATURE

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This section starts on p. 148.

Vacuum cleaners

Over 100,000 vacuum cleaning units made by a particular company are serving industry. That's the theme of a four-page brochure. These heavy-duty, portable machines are being used profitably in practically every type and size plant, it says. Over 5000 of them are in their 25th year of service. Brochure shows latest models. *Invincible Vacuum Cleaner Mfg. Co.*

For free copy circle No. 14 on postcard, p. 153

Welding platens

Bending blocks or welding platens, stands and accessories are reviewed in currently available literature. These blocks measure 5 ft x 5½-in. thick. Each block has 289 holes, 1¾-in. square, spaced 3½-in. center to center. The holes are used for clamping, dogging or spacing. Working surfaces are machined to within a 0.0005-in. degree of flatness. *Acorn Iron & Supply Co.*

For free copy circle No. 15 on postcard, p. 153

Floor maintenance

Heavy duty floor maintenance machines are announced in a new eight-page brochure. The line includes 14, 16 and 18-in. brush sizes to suit every application. They are powered by heavy duty capacitor start motors that drive a planetary system of steel helical gears at a 10 to 1 reduction ratio. The brush operating at 172 r.p.m. starts easily under the heaviest loads for scrubbing, stripping, polishing, steel wooling, sanding and terrazzo grinding. The 14-in machine is powered with a 1/3 hp motor, the 16-in. machine with ½ or ¾ hp motor. *Breuer Electric Mfg. Co.*

For free copy circle No. 16 on postcard, p. 153

Hook scale

Action photos of a hook scale appear in a folder now available. It shows it in weighing operations at several metal plants. The bulletin lists features of the scale as: high guaranteed accuracy, light weight, adjustable gage, sensor-type load cell, low headroom loss, high safety factor, full 360° dial, generous overload margin, dual-range dial and more. The scale is certified and may be sealed in any state. It is approved for sealing in New York, Calif., Mass., and Colo. *Martin-Decker Corp.*

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Parts cleaning

Anything from links to locomotive parts, in any amount of production can be done faster, better and easier, at lower cost, with a new metal cleaning and surface treatment. So states a four-page folder now available. The treatment is performed in one completely automatic, compact unit. It can perform up to 30 operations. *Ransohoff, Inc.*

For free copy circle No. 18 on postcard, p. 153

Instruments, chemicals

Instrument and chemical company publications survey research that has transferred the U. S.'s 3rd largest industry—graphic arts—into a science. It describes a large publisher's laboratory where nylon "sees," and presses print six successive colors at double normal speed. Other sections announce development of a stable direct standard for acids and a more accurate apparatus for melting-point determinations. *Fisher Scientific Co.*

For free copy circle No. 19 on postcard, p. 153

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31	32	33	34	35	36	37	38	39	40
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51	52	53	54	55	56	57	58	59	60

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Burners

Radiant tube gas burners and radiant tube burners (oil or gas) are presented in specifications sheets. They list the burners' features and explain how they operate. Engineering drawings and charts cover specifications and dimensions. *Hauck Mfg. Co.*

For free copy circle No. 24 on postcard, p. 153

Corrugated boxes

"How to Engineer Corrugated Shipping Boxes," describes each step in the development of the modern shipper including study of the product to be packaged, original engineering, exterior box design, construction of a pilot box, and testing. Recently revised, it contains 24 pages. *Hinde & Dauch.*

For free copy circle No. 25 on postcard, p. 153

Instruments

Instruments for analysis, control and data processing are covered in a neat, clean, interesting and comprehensive catalog. The 32-page booklet introduces its work in instrumentation and lists its activities, products and projects. *Consolidated Electrodynamics Corp.*

For free copy circle No. 26 on postcard, p. 153

Polyester film

Heat-sealable polyester film is described in a foldout brochure. It emphasizes heavy duty packaging and protective wrapping abilities of the film. A table details both physical and chemical properties. Heat-sealed with regular equipment to give a seal as strong as the film itself, it is now available in two forms, sealable on one side and sealable on both. *Minnesota Mining & Mfg. Co.*

For free copy circle No. 27 on postcard, p. 153

Motors

The "Synduction" motor, a synchronous induction machine which is providing dependable constant speed, simplicity of operation and low first cost in applications requiring 40 hp and below, is described in a new bulletin. *Allis-Chalmers Mfg. Co.*

For free copy circle No. 28 on postcard, p. 153

Cable connections

Sales promotional literature reviews waterproof, shockproof and rubber insulated cable connectors. It describes a portable kit that produces connections in the field. Connections, it states, outlast ordinary ones three to four times. Five simple steps are illustrated showing how they are used. *Cam-lok Div., Empire Products, Inc.*

For free copy circle No. 29 on postcard, p. 153

Shovel-cranes

Shovel-cranes are covered in a catalog just released. It displays 18 crawler-mounted models ranging from 1/2 to 3-yds, 8 to 75-ton capacities; five truck-cranes with capacities from 12 1/2 to 35-ton; and four self-propelled, rubber-tired models with capacities from 15 to 35-tons. It gives descriptive information on more than 20 new models, all fully convertible to any standard front-end attachment. *Link-Belt Speeder Corp.*

For free copy circle No. 21 on postcard, p. 153

Isolated phase bus

Descriptive, application and dimensional information pertaining to unit supported isolated phase buses is contained in a 20-page booklet. The publication discusses the "zero force" principle which makes unit support design possible. It describes how to plan a bus layout, includes a table of ratings, weights and dimensions, and gives a general description of the company's new forced-air cooled design. *General Electric Co.*

For free copy circle No. 22 on postcard, p. 153

Portable nibbler

Portable and versatile, a lightweight pneumatic metal cutting tool cuts up to 55 ipm through 10 gage stainless steel without distortion on either side of the cut. It eliminates need for expensive stationary equipment or dangerous torches. It is safe, powerful, economical and effortless to operate. These are some of the facts listed for the nibbler in a data sheet now available. It also includes specifications. *Fenway Machine Co.*

For free copy circle No. 23 on postcard, p. 153

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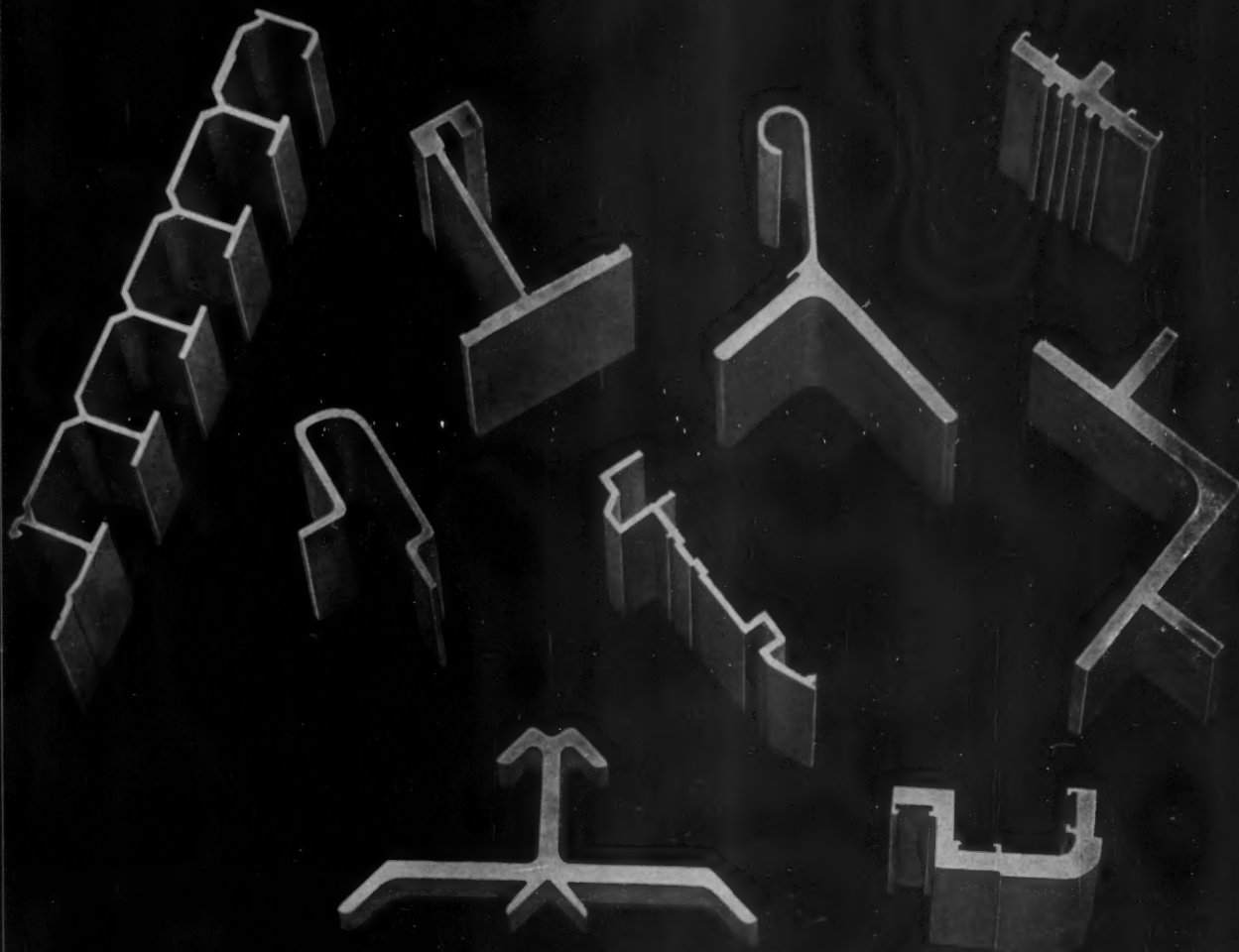
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Zone

State



"Plain and Fancy"

A simple "U" channel, or the most complicated profile, receive the same expert attention when they're extruded in aluminum by Flynn. Qualified metallurgists make certain that the proper alloys for the extrusions are used. Competent designers check profiles to assure maximum strength with minimum material. Whether your aluminum extrusion is custom designed, or taken from Flynn's tremendous stock of dies, you can count on quality, a fair price, and fast service. Ask Flynn first — estimates given promptly.



Free Pocket Guide, "Standard Tolerances: Aluminum Extruded Shapes." Gives standard tolerances for rods and bars, mechanical properties for four aluminum alloys in various tempers. Permanently protected in laminated plastic. Fits shirt pocket. Please send all requests on company letterhead.

MICHAEL FLYNN MANUFACTURING COMPANY *Extrusion Division*

700 East Godfrey Avenue, Philadelphia 24, Penna.
Telephone: FIdelity 2-5500

51 East 42nd Street, New York 17, N. Y.
Telephone: MUrray Hill 2-0625

937 Radcliffe Road, Towson, Md.
Telephone: VALley 3-2090

133 Maple Street, Springfield, Mass.
Telephone: REpublic 3-2814

FLYNN

EXTRUSIONS



MACHINING: Shaping Fixture

Fixture and method simplify shaping "orange peel" type skin . . . Contoured aluminum skins to 0.080-in. thick are vacuum locked and trimmed . . . Hand cutting, filing eliminated.

Shaping of "orange peel" type skin details is simplified with a new tool. Contoured aluminum skins up to 0.080-in. thick are vacuum locked to this new shaping fixture and accurately trimmed. This provides precise butt fittings of the skins in the inertial nose of guided missiles.

The fixture is made of plastic fiber glass laminate, shaped from a plaster cast conforming to the

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 153. Just indicate the page on which it appears. Be sure to note exactly the information wanted.



These are typical of the many piece parts being balanced on the low cost, high production

TAYLOR



BALANCING MACHINES

with

Speed Button Control

Send your piece parts for sample balancing or drawings for recommendations by Taylor engineers.

TAYLOR DYNAMOMETER and MACHINE COMPANY

DYNAMOMETERS • BALANCING MACHINES
DRILLING MACHINES

6411 River Parkway, Dept. 1A, Milwaukee 13, Wis.
INTERNATIONAL DIVISION — DUMMANN WORLD
TRADE CO., Milwaukee 6, Wisconsin, U.S.A.



Shaper blade cuts along parallel trim lines on all four sides.

missile's nose skin contour. Aluminum skin details are placed on the fixture and aligned with tooling pins or positioning tabs located on the oversized edge of the detail. The skin is securely locked in position by creating a vacuum of 18 psi between the skin and a network of vacuum grooves with a ring of 3/4-in. rubber tubing providing the seal.

Pressure is applied and held constant by means of a Marvac venturi unit with a Hansen quick disconnect fitting. This prevents twisting of the vacuum hose during trimming.

Sides and ends of the shaping

fixture are properly angled to lay flat on the shaper table. The shaper blade is thereby permitted to cut along the straight trim lines with one adjustment of the blade.

Combined, the fixture and the new trimming method eliminate hand cutting and filing operations formerly required. It is a development of the Martin Co., Baltimore, Md.

Powdered Metals:

Sintered brass nuts compare with conventional ones.

Hex nuts pressed from brass powder are lower in cost than brass nuts turned out by conventional methods. They also compare favorably in detail, dimensional control and mechanical properties. So reports Midwest Sintered Products Corp., Chicago, who pioneered this new field of application for powdered metal processing.

Conform To Specifications

Brass powder nuts are made by compacting and sintering blanks, which are then cut-threaded to conform to rigid specifications. This method of production combines the most desirable charac-

teristics of each of the traditional methods: punching from sheet or machining from bar stock. By the powder metallurgy process, brass nuts can be made to any desired shape, with very close tolerances, and with tensile strengths of 30,000 to 35,000 psi.

Nuts Have Smooth Surface

The new sintered brass hex nuts have now been tested and accepted by many large scale users and the company is putting into production fasteners in widths from 5/32 to 9/16-in. and thickness from 3/64 to 19/64-in., with a wide range of hole and thread sizes. The smooth surfaced, bright brass appearance of the new nuts is attractive and, for special purposes,



Torque wrench shows sintered nuts' high torque strength.

they are available with cadmium, zinc or nickel plating, or with a black oxide finish.

Torque strength is probably the most significant property to users of nuts. In this respect, the new brass powder hex nuts meet normal demands. In a typical test, #10 (32 x 3/8 x 1/8-in.) brass powder nuts averaged ultimate torque of 60 inch-pounds when applied to a hardened steel screw.

Handling:

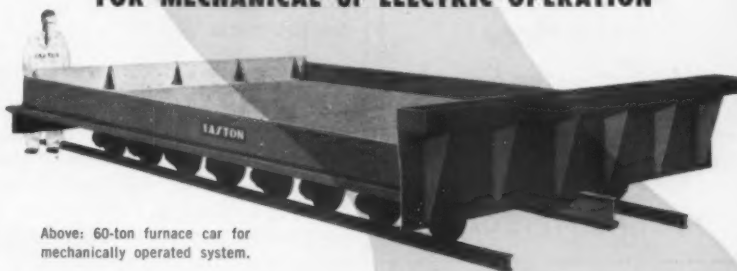
Magnetic attachment allows swift, safe plate transport.

A new magnetic attachment for industrial lift trucks insures fast, safe handling of metal plate.

The attachment, mounted be-

Furnace Cars

FOR MECHANICAL or ELECTRIC OPERATION



Above: 60-ton furnace car for mechanically operated system.

CUSTOM-BUILT and quality-built for dependable service.

Easton experience includes all types of furnace and transfer cars for modern heat treating systems. Built to any desired capacity.

Write or telephone for technical information.

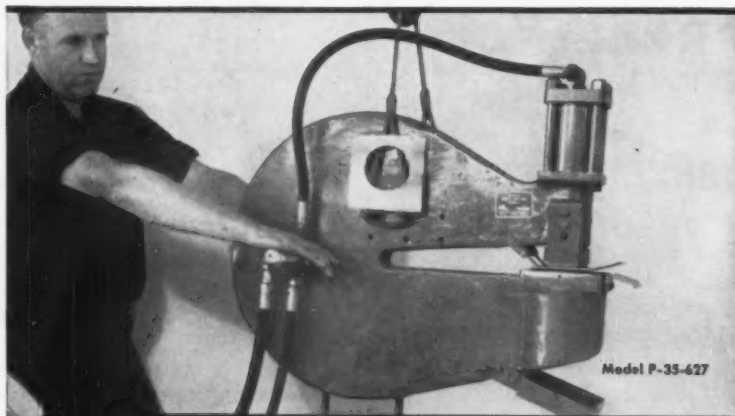
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A-1082

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EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

Take Metallurgical Test Slugs THIS FAST, EASY WAY



Model P-35-627

Only 5 seconds "STOP TIME" with MANCO PORTABLE HYDRAULIC PUNCH

Punches 3 1/2" burr-free sample from 1/4 gauge steel. Ideal for ductility and Rockwell tests. 15" reach. Powered by 5 hp. electric motor, the Manco hydraulic "Hi-Thrust" pump delivers 35 tons thrust. Unit can be suspended by spring ten-

sion balancer or roller mounted to move along track adjacent to cold reduction mill. Other models also available.

Write for information
Dept. 1A 11-B

MANCO MFG. CO., Bradley, Illinois



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"Dependable
Dan"—

Off-the-floor Warehouse Steel Helps Keep a Ceiling On Your Inventory

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Job-Fitted

READY-TO-USE SHEET and STRIP STEEL

COLD ROLLED STRIP
Coils • Cut Lengths • All Tempers
FLAT CR SPRING STEEL*

Soft Annealed
Hard Rolled Untempered
Coils • Cut Lengths
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Cold Rolled • Hot Rolled
Hot Rolled Pickled
Galvanized • Long Terne

Experience-Fitted
to Your Job

*Stocked only in Detroit

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tween the forks of an electric truck, operates automatically when a control switch on the cowl of the truck is placed in the "on" position. Turning the switch "off" permits regular fork handling with the lift truck.

Magnet Prevents Load Slipping

More efficient handling of metal plate is possible with this new development since the action of the magnet prevents the load from slipping or tipping.

The magnet between the forks becomes energized (the switch being on) as soon as the load depresses a bar switch located in the middle of the magnetic plate. This action also lights a small light on the cowl showing the operator his magnet is in operation.

As a safety precaution, the forks on the truck are pivoted at their base. A tension spring at the top of the fork holds them in a straight upright position when



Magnet located between the forks can be turned off or on.

empty, while the weight of a properly placed load moves the fork backs forward slightly against a pair of stops.

If a load is not placed properly on the forks, one of them will not move forward. When this happens, the hoist mechanism of the truck will operate, but the truck cannot be moved forward or reverse.

Automatic De-energization

Upon placement of the load, the magnet is de-energized automatically by the action of the fork backs which are pulled to the rear

by their springs as soon as contact with the load is broken.

There is a demagnetization button centered with the on-off switch and the signal light on the truck cowl. This is for emergency use to over-ride the action of the magnetic attachment in case of unusual circumstances where an operator might be stuck in an inoperable situation with an improperly placed, partially raised load.

Metallurgy:

Degassing process creates
"more reliable" steel.

Clean, gas-free steel more uniformly reliable than conventionally made open-hearth steel of the same nominal composition is now being made in experimental quantities. It is being done by a producer using an American stream-degassing process developed by F. J. Stokes Corp., Philadelphia.

A ten-ton degassing unit is now in operation at this steel-maker's plant. As a result of its successful performance, a significantly larger production system is under construction.

Principal advantage of steel degassing is that by the removal of trapped gases, especially hydrogen, a metal can be produced that is free of discontinuities. These are generally regarded as being caused by the presence of hydrogen and other gaseous inclusions. The major gain is in the reliability of the metal. It is possible, however, that the process may also improve mechanical properties.

Turbine Makers Want It

Demand for degassed steel has been principally exerted by steam turbine manufacturers, who want clean, uniform steel to make turbine rotors that will not fracture when whirled at the high speeds. Manufacturers of precision rolls are anxious for material without voids that often show up after costly machining operations.

In stream-degassing, the refinement takes place by exposing molten material to the effect of a



COURTESY, FORD MOTOR COMPANY

DSC STRIP Scored 100% Job-Performance on '56 Ford Radiator Grille Production

THE FACTS

Here is the front end of a 1956 Ford Fairlane model. Notice the chrome plated radiator grille. This consists of two matching concave units, right and left, joined in the middle. Each unit is a one-piece stamping incorporating frame and latticed grid. The grid section is of continuous-drawn channel design.

DSC STRIP was used by two Ford vendors to make this part during the '56 model year. It wouldn't be "cricket" to divulge the tonnage shipped these customers from September '55 through August '56. It was substantial. The blanks average close to 6 pounds a piece.

The big point, though, is this: Our Detroit Mill batting average on total shipments was "1000" . . . not a single pound was rejected.

THE "SPECS"

GAUGE (standard tolerance)036"

WIDTHS . . . No. 3 Edge . . . ranging from 14" to 23¹⁵/₁₆"
(depending on blanking method)

TEMPER No. 4 Soft

FINISH DSC No. 2 Bright
(suitable for chrome plating)

There's nothing unusual here . . . except that the temper was "custom tailored" to suit the drawing and forming intricacies of the grille; the finish had to meet the requirements of mass-production chrome plating.

Another example of DSC stripmanship at work . . . where the PROOF of the STEEL is in its PERFORMANCE.

Customer Satisfaction Is Our Business

Ask a DSC Customer "Rep" to tell you more about DSC STEELMANSHIP

DSC MILL PRODUCTS, PORTSMOUTH DIVISION, PORTSMOUTH, O.

Hot Rolled and Cold Rolled Sheets • Low and Medium Carbon
Manufacturers' Wire • High Carbon Specialty Wire • Aluminum Cable Strand
Reinforcement • Rope Wire • Tire Bead Wire • Welded Wire Fabric

DETROIT MILL DIVISION, DETROIT, MICH.
EASTERN MILL DIVISION, HAMDEN, CONN.

Cold Rolled Carbon Steel Strip
Flat Cold Rolled Carbon Spring Steel



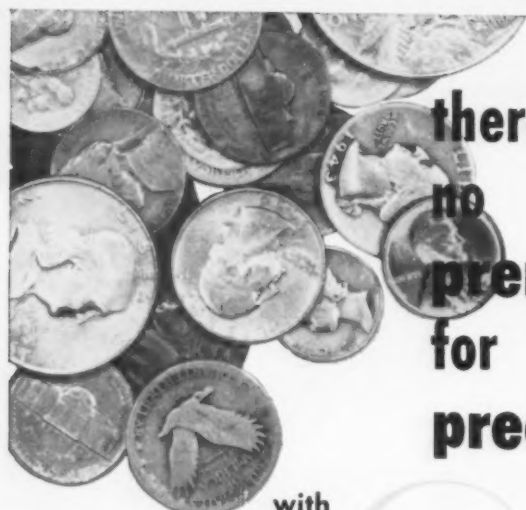
**DETROIT STEEL
CORPORATION**

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN

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Toledo, Worcester, Mass.

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there's
no
premium
for
precision

with

"Fischer Turned"

BRASS AND ALUMINUM NUTS

Costing no more than nuts produced by other, less accurate methods, Fischer precision-turned brass and aluminum nuts make possible important savings in assembly operations. Check these advantages:

Countersunk on both sides for faster starting . . .

Tapped square with face to Class 2 tolerances for smoother, easier running and superior bearing surfaces . . .

Turned from stock under basic size so they're never tight on wrenches . . .

Tapped through, eliminating "blanks" or rejects . . .

Cleaned and degreased before delivery to save you these operations.

Specify Fischer on your next order. A complete range of standard types and sizes is maintained in stock . . . "specials" can be produced quickly and inexpensively.

Write today for
Catalog No. 55

Fischer SPECIAL MFG. CO.

445 Morgan St.

Cincinnati 6, Ohio



C-284-PS

high vacuum. Since this refinement is a surface reaction, the greater the exposure of surface area to the vacuum, the greater the degree of refinement. In induction heated vacuum furnaces, or in arc furnace melting, the amount of this exposure is a function of the speed of agitation of the material. In stream-degassing, the amount of surface area exposure depends upon the relative success with which the stream of molten metal is divided into small particles.

Metal Turns Into Finer Spray

In the Stokes-developed process the molten material is turned into a finer shower or spray of droplets as it passes from the ladle into the vacuum chamber because the level of vacuum is better than that of other systems used to date.

The steel is tapped from an open-hearth furnace into a transfer ladle (holding as much as 100 tons of molten steel). This carries it to the degassing chamber. Here it is poured into an intermediate or "pony" ladle which is kept full from the transfer ladle.

Unit Has 1200 cu ft Volume

The pony ladle is set on top of a specially shaped receptacle on top of the vacuum chamber, which serves as an ante-chamber in the pouring process.

The vacuum chamber itself, which has a volume of approximately 1200 cu ft in the 10-ton unit now in operation, is preliminarily pumped down to high vacuum. An aluminum diaphragm seals the opening to the chamber from the ante-chamber.

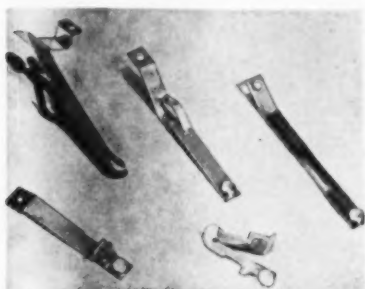
Nonferrous:

**Alloy's use allows
more compact switches.**

In their line of "fast heating" and "infinite" controls supplied to electric range makers, a manufacturer utilizes a beryllium copper alloy to produce units 25 pct more compact than previous models. In addition, use of this material re-

sults in switches which pass the company's rigid tests with 20 pct fewer rejects. Yet they maintain accurate heat control after over half a million cycles of operation (equivalent to 10 to 15 years of use).

Proctor Electric Co. manufactures some 27 different types of the range switches. Over a period of 20 years, they have conducted tests on various copper alloys for movable parts for their switches. The firm sought a combination of high fatigue strength, good resilience for spring uses and good electrical conductivity in parts that conducted current.



Making these parts of beryllium copper reduces unit size.

Proctor engineers concluded that the most suitable material is Berylco 10 alloy. This is a relatively low beryllium content copper alloy supplied by The Beryllium Corp., Reading, Pa.

Proctor buys the alloy in coiled strip form. A 1/2 hard temper is specified. This is heat treated. The strip is cut and stamped in presses to form switch blade and spring parts. Their shapes indicate what severe forming operations the parts must undergo and still stand up under repeated flexing in use.

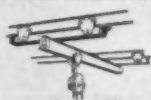
Eliminates Bulky Forms

Inherent strength of this material eliminates bulky and complicated forms, permitting the 25 pct over-all reduction in the unit's size.

The switch line has proved its ruggedness and high quality by passing some 300 separate laboratory tests. In a mechanical abuse test, the control knob shaft is ro-



CRANE ASSEMBLIES



CHAIN HOISTS AND TROLLEYS



ELECTRIC HOISTS



Conco engineered Cranes rate tops with **plant engineers** — for application engineering that is outstanding, for the service of trained field representatives, for unmatched quality that assures minimum maintenance, reduced accidents, increased output. Conco engineers draw on over 37 years experience to design for the age of automation. Write for bulletin 5000A covering the complete line of Conco cranes, hoists and trolleys.

FROM ANY VIEWPOINT A FINER CRANE

JIB CRANES



HAND GEARED CRANES



CONCO ENGINEERING WORKS

Division of H. D. Conkey & Company 15 Grove Street, Mendota, Illinois

AFFILIATES: Conco Engineering Works—Domestic Heating Equipment • Conco Building Products Inc.,—Brick, Tile, Stone

tated 20,000 times. After this the unit must still operate and maintain its calibration within plus or minus 2 pct.

In a heat test, the unit is operated repeatedly at 180°F. Proctor found that only the Berylco 10 alloy retained its initial spring characteristics. Other materials took a permanent "set," which is not permissible because the specifications call for operation at ambient temperatures up to 180°F.

Packaging:

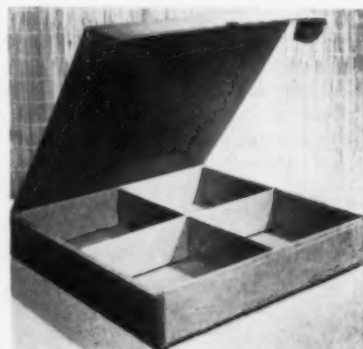
Tungsten mix packed, heated in corrugated folder.

Corrugated folders that replace metal cans are enabling Electro Metallurgical Co. to package 20 lb of tungsten mix in granular form and then harden the material into evenly sized blocks within the sealed containers.

The folders are produced by Robert

Gair Company, Inc., manufacturer of paperboard and paper products. They are intended particularly for sale to manufacturers of small quantities of tungsten type steel.

Folders are constructed with inter-locking partitions which form four cells into which the granular



Entire container can be thrown into molten mass if desired.

material is poured. They are sealed and passed through an electric furnace set at 300°F. In two hours the mix hardens within the box into four five-pound blocks.

Steelmakers use the blocks in any combination according to requirements. If the molten mass is large enough, though, the complete package can be thrown in. The container will burn away.

Handling:

"Iron hand" installation reduces safety hazards.

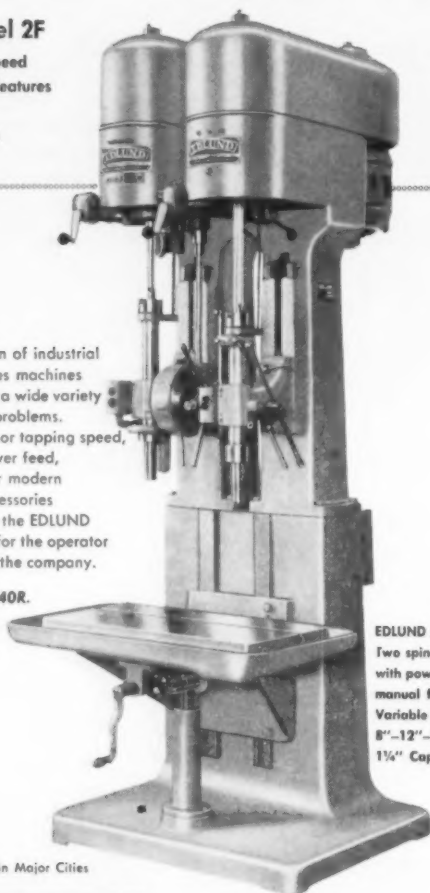
Accident hazards are reduced considerably with an "iron hand" installation at Whirlpool-Seeger Corp., Clyde, Ohio. In addition, the company was able to lower unit costs by transferring one man to other work.

Mounted on an 1850-ton hydraulic press, the "iron hand" first lifts a cylindrical basket to clear its die, and swings it out of the press onto a conveyor. The jaw assembly, specially designed for this application, grips the basket on the flange. Deep drawn to 16-in. from 18-gage steel, the baskets weigh 30-lb and are 21-in.

EDLUND AMERICA'S MOST VERSATILE DRILLING MACHINE

EDLUND Model 2F

Infinitely Variable Speed
Modern Production Features
Long Lasting—
Rugged Construction



The changing pattern of industrial production requires machines readily adaptable to a wide variety of production problems. Selection of any drilling or tapping speed, manual or power feed, and many other modern production accessories make operation of the EDLUND Model 2F a pleasure for the operator and good sense for the company.

Write for Bulletin 140R.

EDLUND Model 2F
Two spindle combination
with power feed and
manual feed.
Variable speeds to 3600 rpm
8"-12"-15" Overhang
1 1/4" Capacity

EDLUND Representatives in Major Cities

**EDLUND
MACHINERY
COMPANY**
Cortland, New York
Division of Harsco Corporation

Write for Bulletin G56 — Complete Line with Cam Feed Units
Bulletin 160 — Model 1F—High Speed
Bulletin 170R—Model 4F—Production



Is this Garter Spring necessary on your Oil Seal application?

The answer lies in an individual *evaluation of your application*. Garter springs, where not required, can take a "free ride" at your expense. The mechanical action created by garter springs can result in excessive torque and friction . . . can often shorten seal life . . . can actually cause shaft wear.

IPC seals are designed, compounded and bonded to provide inherent resistance to operational stress, *often without the added cost of mechanical "pinch"*.

If excessive eccentricity, temperature range or other conditions do warrant the use of mechanical "pinch", IPC engineers will design your oil seal to combine custom compounding with minimum spring "pinch" consistent with good performance.

Before you buy, ask for IPC's recommendation.



















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PACKINGS
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Bristol, New Hampshire

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1. Bonded Washer Seal
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Straight Lip
With Garter Spring |
| 
2. Bonded Case Seal
Double Lip Wiper | 
10. Bonded Case Seal
Limited Contact Lip
With Garter Spring |
| 
3. Bonded Washer Seal
Straight Lip | 
11. Bonded Case Seal
Straight Lip
Thin Rind Type |
| 
4. Bonded Washer Seal
Limited Contact Lip | 
12. Bonded Case Seal
Limited Contact Lip
Thin Rind Type |
| 
5. Bonded Washer Seal
Straight Lip
With Garter Spring | 
13. Rubber Covered
Bonded Case Seal
Straight Lip |
| 
6. Bonded Washer Seal
Limited Contact Lip
With Garter Spring | 
14. Rubber Covered
Bonded Case Seal
Limited Contact Lip |
| 
7. Bonded Case Seal
Straight Lip | 
15. Rubber Covered Bonded
Case Seal Straight Lip
With Garter Spring |
| 
8. Bonded Case Seal
Limited Contact Lip | 
16. Rubber Covered Bonded
Case Seal Limited Contact Lip
With Garter Spring |

When the quality of welded equipment is essential to performance



Job Report Courtesy of
Superior Welding Co., Decatur, Ill.

WELD WITH **ARCOS** 

STAINLESS ELECTRODES

Welded bubble cap trays, such as these, are used to refine petroleum, petro-chemicals, and food products. They—and the welds—are subjected to corrosion from the liquids and gases passing over them. High processing temperatures intensify the corrosive conditions. ARCOS Chromed KMo Electrodes (Type 316 with 2.5% molybdenum) were used because of their ability to resist acid conditions combined with heat. These electrodes—like all Arcos stainless filler metals—produce welds that are trouble-free both during welding and in service.

ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.



TECHNICAL BRIEFS

in diameter. Unloading speeds range up to 200 per hour, depending on press speeds.

Not Powered By Press

Synchronized with the press by means of a rotary limit switch, the "iron hand" does not depend on the press for power, but is operated independently through its own air system. Standard models are widely used to unload automobile body stampings, appliance parts and other large and small stampings at speeds up to 42 strokes per minute. The handling device is a product of Sahlin Engineering Co., Inc., Birmingham, Mich.

Foundry:

**Slag pot weighs-in
at 47,000-lbs.**

Several advancements in the founder's art are revealed in a slag pot made by the Blaw-Knox Co. The pot has a capacity of 480 cu ft and weighs 47,000-lb.

It is one solid casting including the flat bottom and three trunnions on either side. Until a few years ago it was considered impos-



Pot is one solid casting, including the flat bottom.

sible to integrally cast a flat bottom into a slag pot. Most of the flat bottom pots in service today have the bottom plates bolted to the cast steel body of the pot. The integrally cast trunnions are normally found on the slag pot cradle rather than the pot.

Metals:

Nuclear lab utilizes wrought-iron pipe.

Wrought iron pipe is fabricated into a radiant sub-floor heating system at Gulf Research & Development Company's new Nuclear Research Laboratory, Harmorville, Pa.

The corrosion resistant pipe is coiled in concrete flooring to prevent dampness, there and in concrete walls, from creating rust formations on delicate equipment and instruments. The 2 to 5-ft thick walls serve as a shield against possible radiation effects of a Van de Graaff particle accelerator.

Contains 1000-ft of Pipe

A total of 1000-ft of 1-in. wrought iron pipe was used to construct the radiant heating system. It supplements a forced warm air heating system.

The piping, produced by A. M. Byers Co., Pittsburgh, was laid over six inches of slag and a sub-slab of concrete.

Controls:

Standard tools automated without alterations.

Completely automatic manufacturing, without synchronization and without altering standard machine tools, results from linking those tools into an integrated line. One such line in operation at a large automotive transmission plant produces finished and perfect pinion gears at the rate of 900 pieces an hour.

Since it is not necessary to scrap good machine tools, nor to make expensive alterations, the demand feed distribution systems liquidate themselves quickly. About 75 pct of the total cost of such an integrated line is in the conventional machine tools. Ten to 15 pct is in the distributing equipment. The remaining cost is represented by automatic gaging and inspection equipment. The production which

When heavy chrome-moly welds must pass X-Ray Inspection



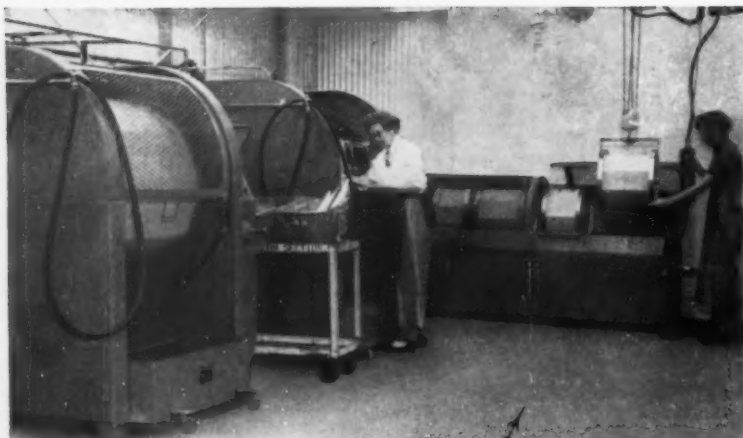
Job Report Courtesy of American Pipe and Steel Corp., Alhambra, Calif.

WELD WITH **ARCOS** 

CHROME-MOLY ELECTRODES

In setting up this job—fabricating heavy alloy components of lead melting pots—new welding procedures were required to assure that all welds would pass x-ray inspection. With the help of Arcos Technical Service, both manual and submerged arc procedures were established and ARCOS Electrodes and Rods were used exclusively. The quality of Arcos weld metal consistently assures internally sound, flaw-free welds. And Arcos Technical Assistance prevented problems on what could have been a "tricky" job. ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.





How **DOUGLAS**

saved 25,000 manhours!

With **SPEED-D-BURR** PRECISION BARREL FINISHING*

An Incredible \$140,000.00 in Dollar Savings!

Time consuming handwork, production delays, difficulty in controlling uniformity and high costs in deburring a wide variety of parts in short runs was a problem faced by Douglas Aircraft. Turning to precision barrel finishing as a possible solution, a survey of various types of equipment and sample lot testing of many parts followed. SPEED-D-BURR engineers recommended a 4 unit installation to begin production (picture above). Within a few weeks, savings began to mount, parts were being turned out faster than ever before and close tolerance finish quality was greatly improved on widely diversified parts from a 30" long casting to small washers—all in the same SPEED-D-BURR installation. Time study records indicated that projected manhour savings would reach 25,000 for the year with a dollar savings of \$140,000.00 (more than 10 times the equipment cost).

Like to read the whole story? Ask for Speed-D-Burr Folder DA-1...

ALSO WRITE FOR CATALOGS:

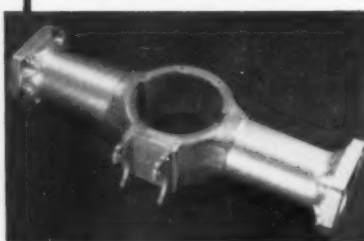
- How to Cut Production Costs 80% or More
- The Futurama Series
- The Mity-Mite Series
- Media and Compounds
- Hot Sawdust Barrels
- Handling and Separating Equip.

*As told in Iron Age Magazine — August 2, 1956

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Distributorships available in some key areas . . . to complete our national sales network.



ONE SAVINGS EXAMPLE

Part No. 5638557-3

Hand Deburr . . . \$11.25 each

Speed-D-Burr50 each

SAVINGS . . . **\$10.75 each**

This is just one of many parts on which exceptional savings were made using SPEED-D-BURR Precision Barrel Finishing.

Service Is Our Most Important Product . . . It Does Not Cost . . . **IT PAYS!**



TECHNICAL BRIEFS

results is perfect parts, at much lower cost.

Progress of parts through such an integrated line can be either in series or parallel. Each machine tool is always supplied at its own demand rate. This holds true whether all, or some, of the machine tools are operating. Maximum machine utilization is, thus, inescapable.

Cargill Detroit Corp., Birmingham, Mich., designers of the system, introduces "elastic" floats into them wherever necessary. These floats maintain an even flow of parts through the line, and absorb the differences in productive capacities between successive machine operations.

The systems controls are made up of standard, conventional components. They are independent of the machine controls.

Testing:

Giant wire rope proofer assures high quality.

After several years of intensive research, development and experimentation, American Chain & Cable Co., Inc., stepped up the tensile strength of wire rope.

To users this was good news. However, it caused the makers some headaches.

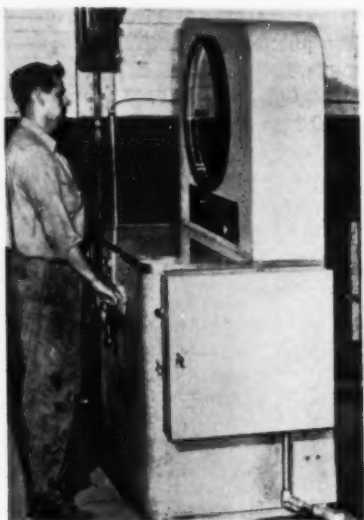
Testing Facilities Inadequate

With the introduction of the company's first mechanical wire rope splice, it became necessary to develop new testing facilities. This was especially true since the wire rope ending was being constantly expanded and improved to utilize larger and larger diameter ropes. Until recently both wire rope and wire rope slings were tested in a 250,000-lb proofloader. This became inadequate for full testing procedures as rope strengths improved and sling diameters rose.

Now, the situation has been remedied with the recent installation at the Wilkes-Barre, Pa., plant of a new universal tester of hydraulic design. The unit is one of

the largest machines of its type to be used in private industry. Its capacity is 600,000-lb; over twice that of the older tester.

It incorporates a long test bed in which specimens over 60 feet in length can both be proof-tested and break-tested. Other units of this capacity, whether in universities or in commercial testing laboratories, are usually set up to handle half this length or less.



Operator watches controls of the cable testing machine.

The giant, construction of which was started about a year ago, was designed in conjunction with the company's engineers, and was built and installed by Baldwin-Lima-Hamilton Corp., Eddystone, Pa. The device is ideal for determining the actual breaking strengths of wire rope products and for proofloading wire rope slings to determine their fitness for specified loads.

Power:

"Canned" motor pumps offer 1600-hp, 2300 volts.

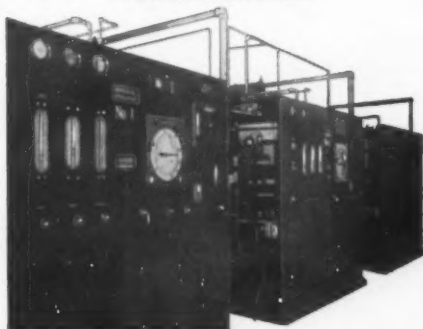
Four 1600-hp, 2300-volt "canned" motor pumps have entered their final stages of construction at Westinghouse Electric Corp.'s atomic equipment plant at Cheswick, Pa. They are the main coolant pumps for the nation's

For Fully Automatic, High Purity, Safe, Economical Furnace Brazing and Bright Annealing of Stainless Steel

Nitroneal Gas Generator

- NO OPERATING PERSONNEL REQUIRED
- COMPLETELY OXYGEN-FREE
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- 30% CHEAPER THAN DISSOCIATED AMMONIA

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Pure nitrogen with controllable hydrogen content that can be varied to meet changing requirements and maintained between .25% and 25% is provided, at low cost, by the Nitroneal Gas Generator for use as material or for processing. Applications include: bright annealing, heat treating and furnace brazing of stainless steel, low and high carbon steels and non-ferrous metals.

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Perforations perplexing you?



If you have a design problem that's got you down maybe Hendrick can be of help. Sometimes the easiest and quickest way to enhance a product's beauty is to include a pleasing pattern of perforations in its design. Hendrick perforated metal not only helps increase a product's overall attractiveness, but also adds to its saleability as well. And whatever material you're using . . . whether it's metal, masonite, rubber, plastic, hard or insulated board for decorative display or fabricating purposes you can draw on Hendrick's long experience and perforating facilities to fill the bill. Write for details.

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AUTOMATION at work ...supported by ACME Weldments



18,240 operations — 80 automobile transmission cases every hour! That adds up to quite a day's work, but it's no problem for this transfer machine built by the Baush Machine Tool Company of Springfield, Massachusetts. Unusual sectional design permits rapid retooling, keeps work handling to a minimum, and speeds production in many of America's largest automotive plants.

To provide the *strength* and *rigidity* required by this complex, automatic machine, Baush engineers specified all-welded steel bases fabricated by *Acme Welding*. Beside being stronger these Acme weldments are lighter and make possible the incorporation of many exclusive design features. Perhaps these advantages of Acme weldments are important to your product . . . whatever your requirements, why not call on Acme today.

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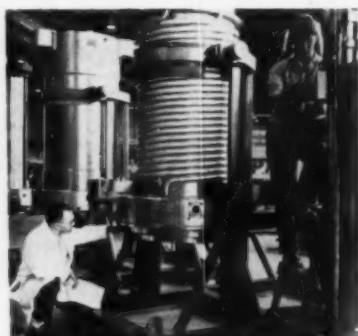
TECHNICAL BRIEFS

first full-scale atomic electric generating station at Shippingport, Pa.

In this type of pump, both the stationary outer coils and the rotor are "canned" in metal, and the radioactive water flows through the space between them. In addition, the water serves as a bearing lubricant.

These are the first canned motor pumps with Class H insulation to be designed for 2300v operation. Each pump weighs nearly 14-tons, stands 10-ft high and is 4 ft in diam. Capacity of each pump is 18,300 gpm at approximately 2000 psi at up to 600°F.

There are no external shaft seals in the motor pumps, and suction and discharge nozzles are de-



Stationary outer coils and the rotor are "canned" in metal.

signed to be welded into the pipeline. Westinghouse, under contract to the Atomic Energy Commission, is building the nuclear portion of the Shippingport plant. Duquesne Light Company of Pittsburgh is building the electric generating portion and will operate the entire station when completed in 1957.

Finishing:

New enamels perform much like porcelain.

A new type of coating looks and performs more like porcelain than any other known organic finish. So reports its developer, Pittsburgh Plate Glass Co., Pittsburgh.

The family of coatings is based on a series of thermosetting acrylic

resins which comprise a basically new chemical composition.

Under development for several years, the finish is a radical departure from baking enamels now in use. Although it is particularly adapted to the finishing of refrigerators and similar equipment, its outstanding toughness and durability may be employed for almost any application where a superior baking enamel is desirable. The product possesses exceptional adhesion to various metal surfaces and primers.

Color Improvements Seen

Comparative tests with alkyd-melamine enamels show that it provides considerable improvement in color and gloss retention on overbake, chemical and detergent resistance, humidity and salt spray resistance, grease and stain resistance, impact resistance, flexibility, hardness and mar resistance. For many applications the product is said to offer in one coat the same protection and perfection of finish as present two-coat finishing systems provide.

Although exterior field tests have been underway for some time and initial reports show excellent weathering properties, no conclusive findings have been announced on possible applications for building panels.

Fabrication:

**Trussless roof possesses
120-ft wide clear span.**

Said to cost one-third less than conventional roof structures, a large trussless steel roof over the new coliseum under construction at Phoenix, Ariz., possesses a clear span 120-ft wide and 260-ft long. It is the first in a new line of low-cost, long-span custom-engineered roof decks.

The roof was completely erected in 7½ days. It will make possible an unobstructed view of the floor from any of 5000 permanent seats. The roof consists of curved 18-gage galvanized corrugated steel sheets, 2-ft wide and from 6 to

COWLES

TRIMMING KNIVES

produce more tonnage per grind

Cowles knives stay on the job longer. They keep mills in continuous production without downtime for knife changes. Manufactured from individually hammered forgings, and heat treated to assure maximum durability, they meet industry's most exacting requirements. Complete range of sizes. Prompt delivery. Widely used by all principal producers and processors. Let us quote on your requirements!



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ALUMINUM TOOLING PLATE

COMPARE...No matter what material you are presently using for tools and fixtures, Red Seal's Alloy 2424-C will give you better performance, lower costs, and increased production.



INVESTIGATE... Red Seal Aluminum Alloy 2424-C for your tooling requirements. Call or write for this new Red Seal Aluminum Products catalog today.

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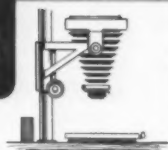
AVIATION



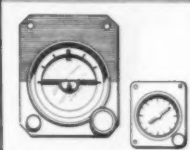
AUTOMOTIVE



PHOTOGRAPHY



INSTRUMENTS

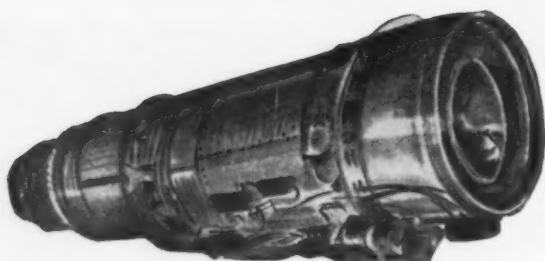


ALLOY 2424-C

Alloy 2424-C is Red Seal's new designation for their aluminum tooling plate and bar stock. The new designation is to help you better understand material composition. The "C" indicates material is cast.

RED SEAL METALS CO.

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TINIUS OLSEN

Helps Take the "Shakes" Out of Supersonic Jets

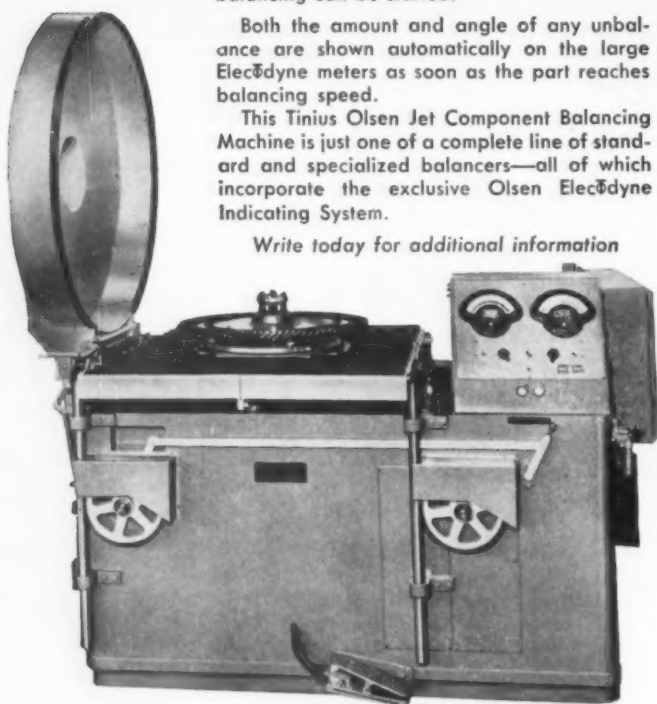
Whirling at speeds in excess of 10,000 rpm, turbine and compressor stages within modern jet engines must be accurately balanced to check destructive vibration.

Tinius Olsen has led in the development of specialized machines that balance jet turbine and compressor stages with unmatched accuracy and at maximum production rates. Awkward, manual handling of parts is eliminated by this conveyORIZED machine. Complete safety is assured by the air operated shroud which must be lowered before balancing can be started.

Both the amount and angle of any unbalance are shown automatically on the large Elecodyne meters as soon as the part reaches balancing speed.

This Tinius Olsen Jet Component Balancing Machine is just one of a complete line of standard and specialized balancers—all of which incorporate the exclusive Olsen Elecodyne Indicating System.

Write today for additional information



One of the compressor stages of a jet engine is set for rapid accurate balancing on an Olsen Elecodyne.



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TINIUS OLSEN

TESTING MACHINE COMPANY

2120 EASTON ROAD • WILLOW GROVE, PA.

Testing and Balancing Machines

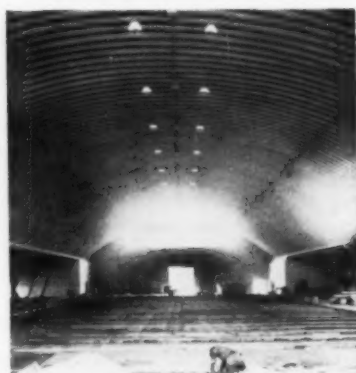
TECHNICAL BRIEFS

10-ft long, fastened together by nuts and bolts to form self-supporting arches. Its trussless design completely eliminates pillars, posts, purlins or supports of any kind.

Less Than 1/16-in. Thick

Although less than 1/16-in. thick, the steel roof will withstand hurricane-force winds in excess of 113 mph and will support loads up to 42 pounds per square foot (equivalent to 5½ ft of snow).

The height of the roof, 40-ft at the center, increases the building's potential for attractions which require unusually high ceilings.



Interior has no poles or trusses to block vision.

Thermal insulation, acoustical treatment and fire protection are provided by a ½-in. layer of Zonolite acoustical plastic machine-sprayed directly to the metal underside following the pattern of the corrugated curved ceiling.

Wonder Building Corp. of America, Chicago, the builders, are currently erecting similar roofs over new arenas in Jackson, Mich.; Wichita, Kans.; Rochester, N. Y.; and Colorado Springs, Colo.

Diecasting:

Diecasting process solves production problem.

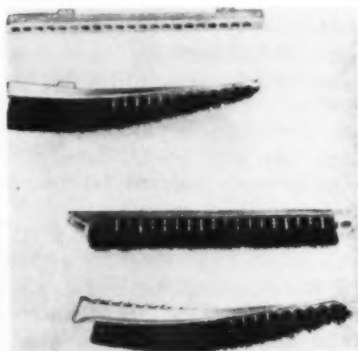
In designing brush backs for agitators of upright electric cleaners, engineers of the Hoover Co., North Canton, Ohio, explored possibilities of production by die-

casting. They learned that, ordinarily, these parts could not be die cast in the required shape economically. This problem was neatly solved, however, through the "know-how" of a job-shape diecasting producer.

Low-Cost Job Not Feasible

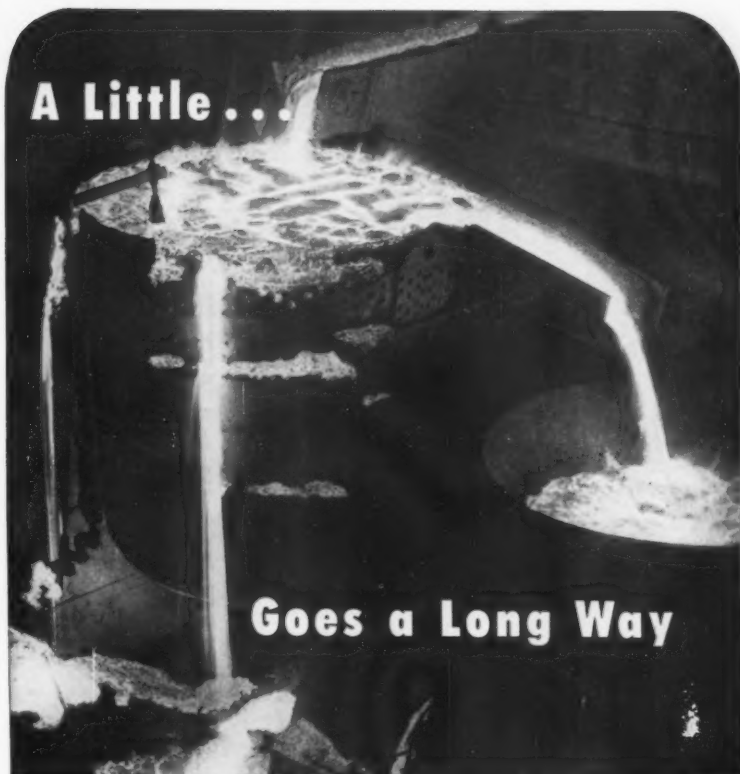
The function of the cleaner's brushes required the metal backs be helical in contour for instantaneous contact of only a limited portion of the bristles. This reduces noise and power consumption and increases cleaning efficiency. This brush back shape is not feasible for low cost diecasting since the anchoring holes for the bristles are not parallel to the motion of the die. Therefore they cannot be formed by fixed cores.

The problem was met by taking full advantage of the ductility of the die casting metal. The brush backs were cast straight. Bristles were anchored in the holes. Castings were then cold formed approximately 115° to the required helical contour. Even with the extra forming operation, die casting proved to be the most economical method of production since no machining is necessary on the cored holes.



Upper pair of brush backs are of aluminum, lower ones of zinc.

Cold forming of die castings is only possible when careful control is exercised in the formulation of the alloys. This is because impurities in the metal will decrease ductility and cause breakage during forming.



Just small amounts of specialized Foote alloying agents go a long way toward improving the quality and workability of steels of many types. Here are three examples:

STAINLESS STEELS—Foote ELECTROMANGANESE® (99.9+% manganese), is the purest, most convenient and reliable manganese alloying agent for stainless and other alloy metals—especially the low nickel, high manganese 200 series.

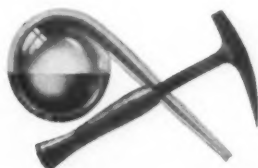
Foote NITRELMANG®, a nitrided grade of electrolytic manganese metal, offers high nitrogen recovery in the production of nitrogen containing stainless steels.

RIM STEELS—Foote RIMEX® intensifies the rimming action to produce a thick skin of high quality steel relatively free of blowholes.

FREE-MACHINING STEELS—Foote MANGANESE SULPHIDE, a fume-free ladle additive, improves the hot rolling behavior and quality of high sulphur, free-machining steels.

Foote NITRELMANG®, is an impurity-free source of nitrogen and manganese for high quality, free machining steel.

Foote—the leader in specialized alloying agents for the metallurgical industry



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● **NYLOK'S®** are easy to take-up or back-off. Stay locked at ANY depth... need not be fully seated. Give smooth torque with no damage to threads or seating surfaces.

THE SECRET... a permanent insert of tough, resilient nylon with positive LOCKING and SEALING properties easily adapted to any ② threaded fastener.

ELIMINATES costly locking devices and double inventory. Saves handling and assembly time.

● **WRITE** for our NEW brochure. Call ② for quotes.

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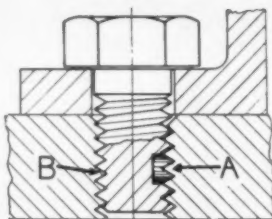
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SELF-SEALING**

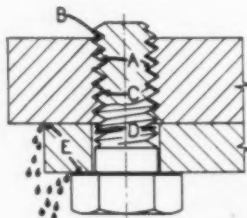
NYLOK® FASTENERS

HOW NYLOK WORKS



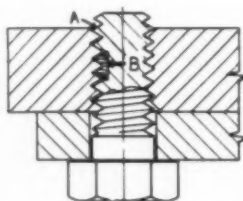
● Resilient nylon pellet (A) sets up lateral thrust which wedges mating threads smoothly together (B). All locking action is on the threads. Tight, metal-to-metal union... positive, leak-proof lock.

HOW NYLOK SEALS



STANDARD BOLT

● Axial force causes load-bearing faces to meet tightly at (A). Fluid is prevented from following helical path down to flange, or bolt head. Nothing, however, prevents fluid entering above non-load-bearing faces (B) from following helical path (C) to clearance hole (D) and seeping out at (E).



NYLOK BOLT

● With NYLOK® seal, both load and non-load-bearing faces meet in tight metal-to-metal union. Fluid entering at (A) flows only as far as NYLOK pellet (B) which provides effective dam to further flow... puts an end to leakage.

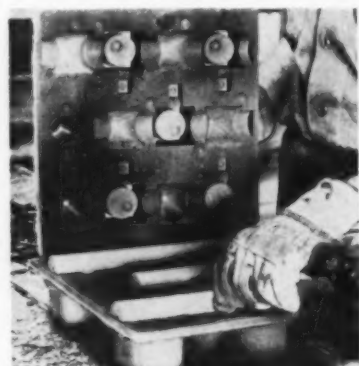
TECHNICAL BRIEFS

Foundry:

Aluminum casting production doubled by shell molding.

Twice as many aluminum castings, produced at lower unit cost, resulted from a chain link fence manufacturer's decision to do his own shell molding with phenolic resins.

Formerly, Allied Chain Link Fence Co., Houston, Texas, used four green sand foundries to supply cast aluminum fittings for its fences. The company based its decision to try shell molding on the simplicity and economy of the process. Ordinarily, shell molding



Thin shell molds are bonded together with phenolic resins.

is favored for the high degree of dimensional accuracy and close tolerances it offers. Allied was attracted however, to the method by the possibility for unit cost savings from integrated, flexible production with reduced labor and fewer finishing operations.

Thin shell molds in which particles of sand are bonded together by Bakelite phenolic resins produce smooth as-cast surfaces free from burnt-in or burnt-on sand. Such castings need little or no finishing.

Imperfections Eliminated

Instead of machining out holes for attaching fittings to fence posts, the company uses the same material for cores to cast fittings with the needed openings. Blow-holes and other surface imperfections are eliminated by the ability

of the porous shell to allow gases to escape when pouring the molten metal.

During cooling cycles shell molds permit freedom for metal shrinkage and thus reduce the number of rejects. The firm's new shell mold foundry now produces more than 60 different castings of fittings or ornaments for fence posts and gates. About 6000-lb of metal are poured per day into shell molds at the foundry. Since shell molds are light in weight, relatively small in volume, and have the dimensional stability of phenolic resins, they can be prepared in advance and stored without taking up very much foundry floor space.

Finishing:

Aluminum etchant cuts costs, gives brighter surfaces.

Better looking, more evenly etched aluminum surfaces, reduced materials costs and less maintenance time reportedly result from the use of a newly developed aluminum etchant.

Contains Scale Inhibitor

Developed for use as a caustic etchant bath, it contains an inhibitor which eliminates formation of scale on tank walls and coils. It also provides a built-in means of minimizing formation of sodium aluminate, an etching inhibitor at high concentrations, providing maximum utilization of the caustic soda.

The bath is initially made up with 8-oz/gal of etchant. As sodium aluminate builds up, the etchant concentration increases so as always to exceed the sodium aluminate content by 3-oz/gal. The latter will reach a maximum of about 15-oz/gal.

Operates For Long Periods

By maintaining this excess etchant content, the bath can be operated for long periods without dumping, since hydrous aluminum oxide will settle out in the form of sludge. Dumping is necessary

TRU-STEEL[®]

SHOT

CONSISTENTLY UNIFORM IN



TOUGHNESS . . .



HARDNESS . .



LONG LIFE . . .

**EVERY
SHIPMENT
THE SAME!**



**NOW SOLD IN
50-POUND BAGS**

You pay more for steel shot than for other types because you expect more from it -- longer life, faster cleaning, lower machine maintenance costs -- lower over-all cleaning costs.

Tru-Steel gives you all of that, and does it **consistently** because Tru-Steel is uniform in toughness, and hardness, uniformly round and solid, from one lot to the next.

What makes it so? Well, the making of Tru-Steel is our only business; we make no other type of shot for sale. Tru-Steel is our bread and butter -- we **have** to make it **good**. Modern, unexcelled melting, heat-treating and laboratory-control equipment, **plus** top-notch metallurgists who know shot making as no others do, make Tru-Steel the product of specialists. Isn't it reasonable that it should be better?

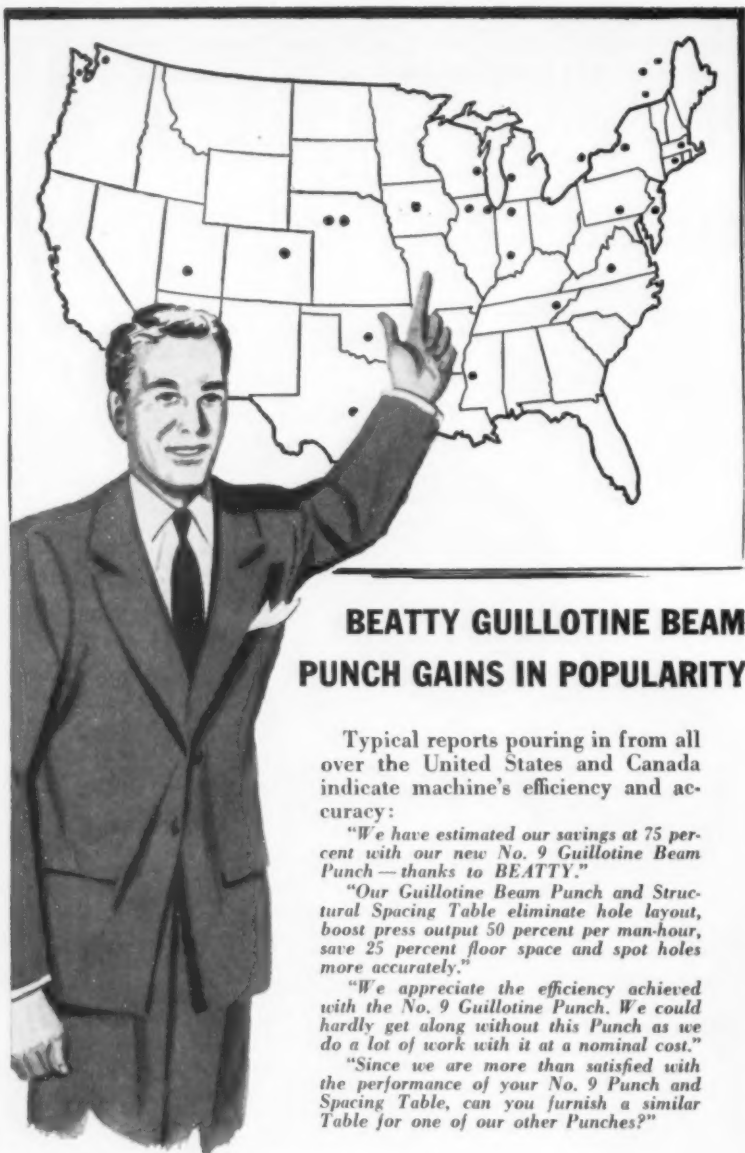
TRU-STEEL

Manufactured by
STEEL SHOT PRODUCERS, Inc.

Butler, Pa.

Subsidiary of Pittsburgh Crushed Steel Co.
Pittsburgh 1, Pa.

Sold and recommended by PANGBORN CORPORATION, Hagerstown, Md.



BEATTY GUILLOTINE BEAM PUNCH GAINS IN POPULARITY

Typical reports pouring in from all over the United States and Canada indicate machine's efficiency and accuracy:

"We have estimated our savings at 75 percent with our new No. 9 Guillotine Beam Punch—thanks to BEATTY."

"Our Guillotine Beam Punch and Structural Spacing Table eliminate hole layout, boost press output 50 percent per man-hour, save 25 percent floor space and spot holes more accurately."

"We appreciate the efficiency achieved with the No. 9 Guillotine Punch. We could hardly get along without this Punch as we do a lot of work with it at a nominal cost."

"Since we are more than satisfied with the performance of your No. 9 Punch and Spacing Table, can you furnish a similar Table for one of our other Punches?"

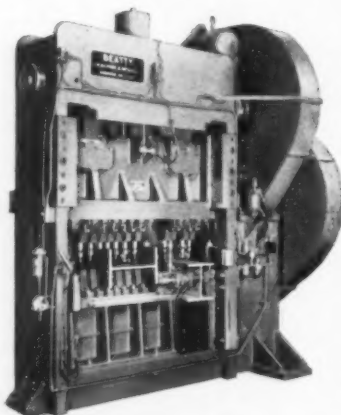
PRODUCTION GIANT REQUIRES LESS FLOOR SPACE

Ideal machines for punching flanges and webs of beams, Beatty Guillotine Beam Punches require less floor space, offer lower first cost and extreme rigidity. Large die space, clear working space and two-point application of force to the ram affords full capacity loading and punching across the face of the ram.

200-ton Model 9, illustrated, for beams up to 30", punches all holes in web of 30" beam. 150 and 350 ton models also available.

Write For Full Details

BEATTY MACHINE & MFG. CO.
936 150th St., HAMMOND, IND.



only when sludge becomes excessive, and it can be flushed through standard sewage facilities or recovered, if desired.

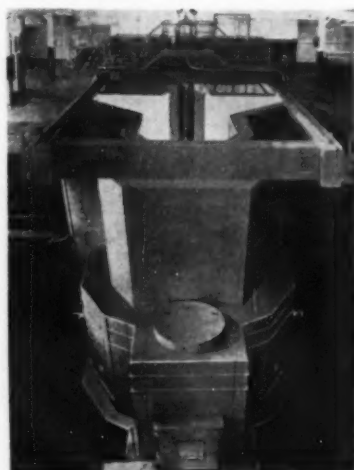
The etchant is a development of Hanson-Van Winkle-Munning Co., Matawan, N. J.

Atomic Energy:

First private-owned center set up for research.

The nation's first privately owned nuclear research center includes a one million watt reactor. It is the largest of the "pool type" yet to be put into service in this country and is designed exclusively for research purposes.

Located at Columbus, Ohio, the reactor and research center are owned by Battelle Memorial Institute. The reactor uses solid uranium-235 fuel.



Door in the center at the bottom opens into the "thermal column."

The core, composed of fuel elements and boron control rods, is suspended 22-ft below the surface in a large pool of highly purified water. The water serves as the coolant and as a shield to protect personnel from radiation. It is expected that the reactor will operate 24 hours a day, six days a week. It was designed by Battelle physicists and engineered and built by the American Machine and Foundry Co.

Battelle's Nuclear Research

Center was built in anticipation of the large expansion of nuclear research as a result of the Atomic Energy Act of 1954, which permits private industry to enter upon commercial development of the atom. It makes available to industry complete facilities for peacetime nuclear energy studies.

The new reactor is basically a nuclear apparatus for producing gamma rays and nuclear particles called neutrons. These two products will be used in research to further various sciences, including metallurgy.

The reactor's use will include research on possible improvement and development of numerous metallic products and processes.

The Nuclear Research Center, built entirely with Battelle funds, is at liberty to contract with private industry for nuclear research without government security restrictions. At the same time, a spokesman indicates that the center's technologists are prepared both to maintain industrial confidences and, where applicable, to observe government security regulations.

Heat Treating:

Stress relieving oven houses 12-ft diam vessel.

Conveniently located to connect with production lines, a recently installed furnace accommodates a vessel 12-ft diam by 78-ft long in one heat.

The gas-fired furnace will normally operate at 1100 to 1200°F, with a maximum range to 1400°F. Equipped with the latest control and recording instruments, it measures 80-ft long and 17-ft high at the door and is lined with 9-in. of fire brick and one inch of insulating block. Heat is provided by 48 burners recessed at regular intervals along the sides.

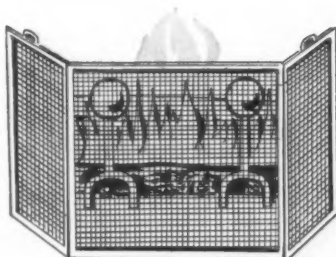
Introduced By Furnace Car

Vessels are introduced into the furnace by a furnace car. This is made up of eight four-wheeled sections and chain driven by a 10-hp electric motor located outside the



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fine
textiles

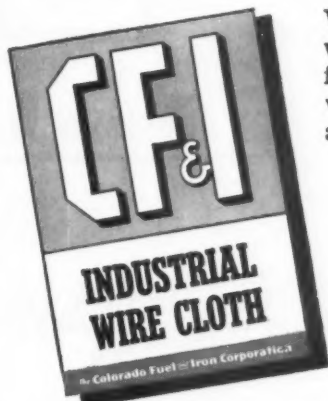
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126 Sidney Street, **Cambridge 39** Massachusetts

oven area. Furnace car tracks extend through the flank of the production bays to permit easy loading of vessels. The massive door of the furnace is opened and closed by a 2-hp electric motor outside the oven.

Heats Vessels, Then Cools Slowly

The stress relieving process heats vessels to slightly below the critical range, then cools slowly. Its application reduces internal



Furnace steps up quality control on pressure storage vessels.

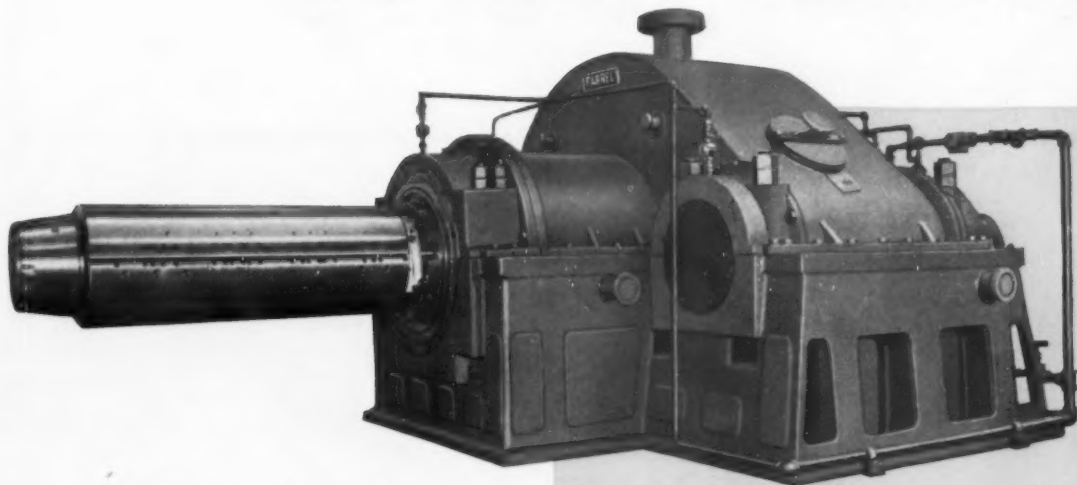
stresses caused by rapid cooling, cold forming, rolling, bending or straightening, or by welding. During its five-hour operating cycle, the furnace is pre-heated to 600°F before the vessels are placed inside. Then it is gradually increased in temperature to maximum heat necessary for a specified time and finally permitted to cool slowly.

Can Handle Largest Tanks

One standard 30,000-gal. tank or combinations of smaller tanks may be stress relieved in one heat by the furnace. In two heats, the furnace is capable of stress relieving the longest tanks now manufactured, or the same capacity vessels with larger diameters.

Among the largest of its type in the South, the furnace is expected to open new production fields to its operators, the J. E. Beard Co., Shreveport, La. With vessels both stress relieved and X-rayed, a joint efficiency of 95 pct may be achieved, according to the 1952 ASME code.

Here's an example of a tailor-made drive



Whatever your drive requirements for rolling mills or auxiliary equipment, no matter how unusual the design, size or capacity, Farrel will build you a unit to best handle the job.

As in the example given, each drive is tailor-made for the application. Power and speed, type and gauge of metal to be rolled, process (hot or cold), nature of load (continuous or intermittent), type of drive motor—all are taken into account in determining the size, material and type of construction.

This development of a Farrel drive assures optimum efficiency, plus the inherent strength to withstand the shocks, stresses and wear encountered in continuous, heavy-duty service.

Why not discuss your gear drive objectives with Farrel engineers?

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Farrel-Birmingham®

1500 HP WINDER DRIVE—This unit transmits power from an adjustable-speed motor, operating at 225/562 RPM, to a collapsible winder. Maximum block speed is 141 RPM; maximum strip speed is 738 feet per minute. Winder will handle a coil of 20" inside diameter, 48" outside diameter by 49" width. Maximum weight of coil 20,580 lbs. An exceptionally large main bearing carries the high overhung load.



WRITE FOR BULLETIN 275, which illustrates a few of the many types of rolling mill drives and pinion stands built by Farrel-Birmingham.

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NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 153 or 154.

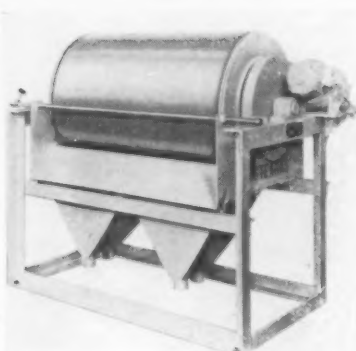


Turret drilling machine features speed, precision

This turret drilling machine performs consecutive drilling, reaming, counterboring and tapping operations in large circular patterns. All these operations are accomplished with speed and precision in one handling of the work. The large circular table accommodates rotary fixtures up to 48-in. in diameter. It is equipped with a complete coolant system, requires little floor space, and permits the operator to work in a conventional position. The turret carries six spindles which work on a common axis and are indexed into position as required. Speed, depth and re-

versals for tapping are preset for each spindle and repeat automatically as the turret is indexed. The workpiece is loaded in a rotary fixture and indexed from one hole location to another. All necessary operations are performed at each hole location by indexing the turret. The quill of this machine, which carries the turret, is counter-balanced for extreme sensitivity and provides six inches of travel. The machine's head is separately counter-balanced and adjustable through 15-in. of travel. *Howe & Fant, Inc.*

For more data circle No. 29 on postcard, p. 153

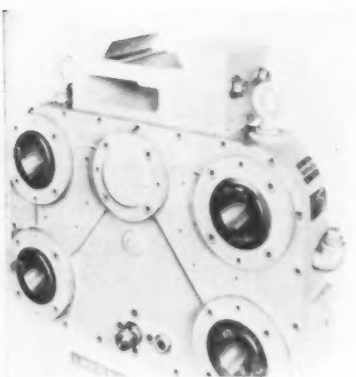


Magnetic separator boosts magnetic recovery

Efficient recovery of magnetic media separation plants is a feature of this magnetic drum separator. Designed especially for recovery of magnetite or ferrosilicon media in coal and ore processing plants, the new model separator produces a magnetic concentrate of high specific gravity, even from non-densified slurry feeds. A powerful permanent magnet assembly lifts out magnetic particles from the

feed as it flows under a rotating drum. Better than 99 pct of the magnetite from coal slurry or ferrosilicon from ores can be recovered automatically and economically. Capacity of the separator, based on actual performance, is rated at an average 8-gpm per inch of magnet width. A 30 x 45-in. unit can be rated at 360-gpm. *Stearns Magnetic Products.*

For more data circle No. 30 on postcard, p. 153



Fixed center milling head serves special applications

Built for a special application, a large fixed center milling head mounts on the over-arm of a milling machine and is supported against the machine column. Special short type milling machine spindles containing standard No. 50 taper are incorporated for using form cutters in steel plate. They also eliminate overhand and provide a rigid mounting of tools. The special milling head has full ball bearing construction of all moving

parts. Gears are of the wide faced helical type made from chrome-molybdenum steel. They are fully heat-treated and hardened to provide strength and assure long operating life without appreciable wear. Spindles are similarly made from chrome-molybdenum steel. A circulating oil pump provides complete oil lubrication to all bearings and gears. *Thriftmaster Products Corp.*

For more data circle No. 31 on postcard, p. 153

ALCO FLANGES...



Craftsmanship in steelmaking, forging and machining assures quality in the ALCO flange.

The ALCO flange is produced of high-quality carbon or alloy steel, made in ALCO's own furnaces. Steel production by the flange manufacturer lowers your welding, preheat and postheat costs because exact metallurgy is assured.

Forging and rolling techniques, drawn from ALCO's extensive experience, increase the quality of the ALCO flange. Metallurgical laboratories check metal characteristics through every step of flange production.

Finish and tolerances on the ALCO flange are provided by skilled machinists. You

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The ALCO flange is available in a wide range of metallurgies to almost any specification. Fast delivery and prompt service on standard flanges are available from two locations, Beaumont, Texas and Latrobe, Pa. Sizes range from 18 in. up.

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Index welder promises increased production

Decreased cycle time is the key feature of a new automated eight-station trunnion-type index arc welding machine. It features a unique cam index mechanism and a simple cam clamping device. In addition to increasing production, the units also simplify overall machine complexity. The machine illustrated welds by the CO₂ shielded arc method. An outer cup and support bracket together produce 433 automotive motor mount bracket assemblies per hour at 80 pct ef-

ficiency. By changing the clamping fixture, the machine can be adapted to a variety of two-piece parts which require joining with longitudinal welds. The basic design is adaptable to submerged arc or argon shielded arc welding. The eight-station trunnion type index carbon dioxide-arc welding machine is 8-ft high and occupies about 4 x 5-ft floor space. Two 600 amp rectifiers supply weld current. *Expert Welding Machine Co.*

For more data circle No. 32 on postcard, p. 153



Pallet truck offers greater floor clearance

This high floor clearance hydro-electric pallet truck gives a greater floor clearance at critical spots during pallet handling operations. In order to lessen the damage which occurs to the bottom boards on pallets because the operators fail, at times, to completely lower the forks, the manufacturer built

into their hydraulic system a special automatic lowering control. This permits the pallet load to be lowered gradually to the floor or into position. When the weight is released from the forks, they immediately drop down into their lowered position. *Lift Trucks, Inc.*

For more data circle No. 33 on postcard, p. 153

SUPER MARKET SHOPPING

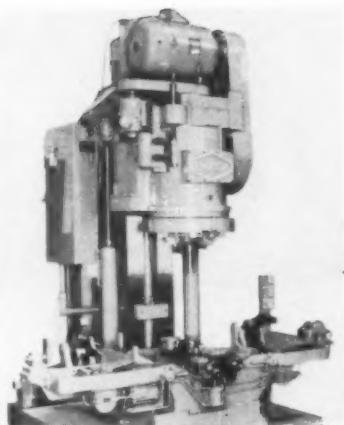


Unit makes an even cut across entire housing face

This unit makes an even cut entirely across the face of a rear axle housing. On loading, a hydraulic clamping fixture grips the two ends of the housing. Next, a gage on the fixture swings out over the center of the housing to locate the center. Then a jack raises the center of the housing to the gage. Before the facing operation begins, the gage swings out of the way. The fixture handles four different size housings. Tooling is a standard cross feed facing head. The machine can be adapted to other uses

such as boring, drilling and tapping, simply by changing heads. The unit can be easily retooled for changes in product or production methods. This machine can also be completely automated with loading and unloading devices and conveyors. Consequently, it makes automation feasible even on lower production runs, according to the manufacturer. A typical fixture turns out 34.2 housings per hour at 100 pct efficiency. *Baker Brothers, Inc.*

For more data circle No. 34 on postcard, p. 153

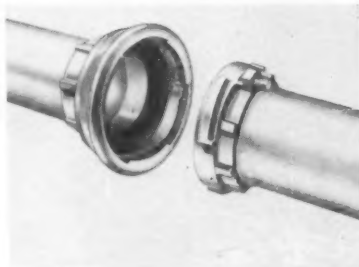


Aluminum pipe coupler withstands 1000 psi pressure

An industrial coupler for portable aluminum pipelines will withstand working pressures up to 1000 psi. It is available both in OD and IPS pipe sizes. It is a fast-acting coupler. Heavy breach-acting jaws secure the coupler with a quarter turn. A lock screw spins up in an instant and locks the coupler

against untwisting through line torque. No metal part of the coupler is exposed to the material within the line; a special aromatic resistant gasket is placed so that there is almost no disturbance of flow to create friction losses. *Food Machinery & Chemical Corp.*

For more data circle No. 35 on postcard, p. 153



FOR CUSTOMIZED CONVEYORS WITH MAY-FRAN STANDARDIZATION

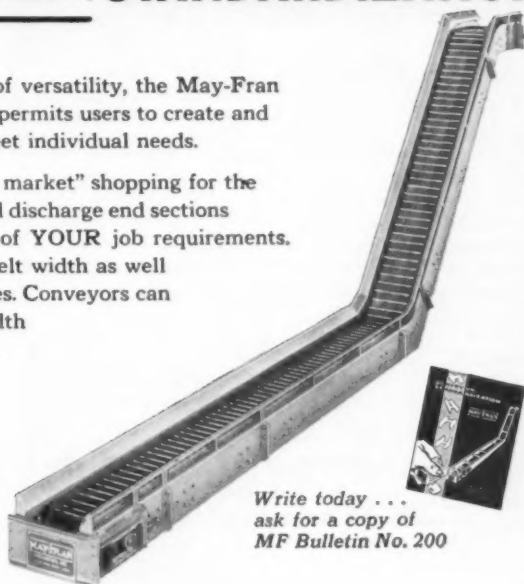
Developed to provide the ultimate of versatility, the May-Fran program of **STANDARDIZATION** permits users to create and construct their own conveyors to meet individual needs.

It literally provides a type of "super market" shopping for the straight, curved, inclined, take-up and discharge end sections required to meet the specifications of **YOUR** job requirements. Sections can be furnished to meet belt width as well as load bearing and volume capacities. Conveyors can be changed relative to length or width with only a minimum of downtime.

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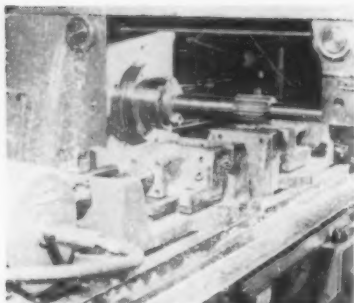
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MF Bulletin No. 200



2200-MF



Hydraulic vises can quickly convert to another job

Air powered hydraulic machine vises are being promoted by the manufacturer as a half-dozen work holding fixtures in one. This is because of the ease and economy with which they can be converted to different applications. They are made with removable jaw faces. These can be replaced with the user's own jaw inserts for holding

any round, rectangular, or angled work piece. Vises bolt quickly to any standard machine. One unit can be used for milling, drilling, broaching, shaping, grinding, and many other machine operations. They provide 9000-lb of locking force wherever needed. *Wilton Tool Mfg. Co., Inc.*

For more data circle No. 36 on postcard, p. 153



Install Thomas Flexible Couplings

First cost is only cost when you buy Thomas Flexible Couplings . . . because Thomas Flexible Couplings are correctly engineered, have no wearing parts . . . need no lubrication . . . eliminate future maintenance costs. Even more, Thomas all-metal couplings can be inspected while running—ending inspection shut-downs!

For all practical purposes, properly installed and operated within rated conditions, Thomas Flexible Couplings will last forever.

NO LUBRICATION . . . NO MAINTENANCE . . .

There Are No Wearing Parts

Under load and misalignment, only Thomas Flexible Couplings offer all these advantages:

1. Freedom from backlash—torsional rigidity
2. Free end float
3. Smooth, continuous drive with constant rotational velocity
4. Visual inspection while operating
5. Original balance for life

Write for Engineering Catalog 51A



WARREN, PA.

Shell core blower

Dual station fully automatic hollow core blow and dump machines feature a swinging head. An exclusive sand feed arrangement delivers sand from main bin to self-feeder hopper and transfers sand to tube between blowing cycles. Thus, one



side is curing cores while other side is blowing cores to more than double the output of conventional machines. Electrically controlled heater units assure the wall thickness desired. (450°F. will cure a 1/16 in. shell in 15 seconds). *Harrison Machine Co.*

For more data circle No. 37 on postcard, p. 153

Lightweight sander

Weighing only 3-lb, a lightweight orbital sander fits readily into the palm of the hand. The high-speed unit operates on 6000 cycles for fast material removal. It works at 40 psi air pressure. Air consumption is only 5 to 7 cfm. *Sundstrand Machine Tool Co.*

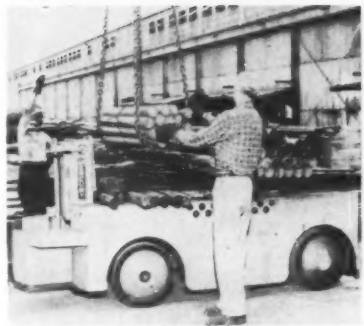
For more data circle No. 38 on postcard, p. 153

Burden carrier does heavy-duty materials handling jobs

Recommended for use in steel mills, fabricating plants and other fields where heavy loads must be transported, this standard straight-frame burden carrier has a 6000-lb capacity. Its platform is 46-in. wide by 89-in. long by 33½-in. high. The truck is battery operated. It has magnetic contactor-type control, four speeds forward and four reverse, and four-wheel

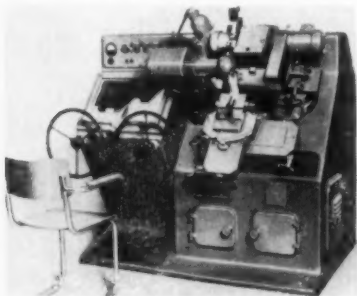
steer with an automotive-type horizontal wheel. The drive axle is a double-reduction spiral bevel and spur gear unit. Brakes are the external contracting type with the drum mounted on the intermediate pinion shaft. Tires are 20 x 5-in. solid rubber, flat-base, pressed on type. It has an all-welded steel frame. *Mercury Mfg. Co.*

For more data circle No. 39 on postcard, p. 153



Optical grinders

A new optical profile grinding machine permits an enlarged view (up to 100 times) of a workpiece during grinding. The grinder encompasses the latest developments in optical profile grinding machine design. It is currently available in



two models. The first type has a magnification of 20x and 50x with a maximum workpiece thickness of 2-in. The other offers magnifications of 10x, 20x, 50x and 100x. It handles a maximum workpiece thickness of 3.15-in. *Carl Hirschmann Co., Inc.*

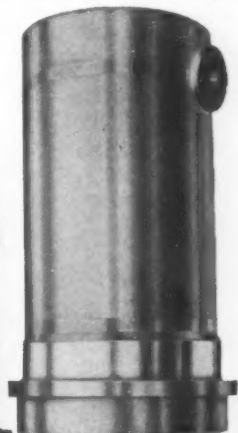
For more data circle No. 40 on postcard, p. 153

Titanium strip

To facilitate experimental and development work on honeycomb structures where high temperatures are important considerations, a producer is now manufacturing titanium strip in thicknesses down to 0.001-in. For temperatures up to 700°F, titanium possesses resistance to heat and corrosion, plus high shear and tensile strengths. The titanium strip is available in tolerances as close as ±0.0001-in., in widths from ¼ to 6-in., in quantities from one pound to thousands. *American Silver Co.*

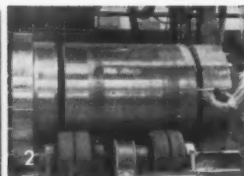
For more data circle No. 41 on postcard, p. 153

Need Large Hydraulic Cylinders?



BUILT TO REQUIRED SIZES AND TOLERANCES BY

TITUSVILLE FORGE



Hydraulic cylinders combining the advantages of thoroughly hot worked steel and clean automatic welding are being furnished by Titusville. Such cylinders insure the user of better physical characteristics (hollow forged shell and flanged sections together with upset forged top or dome sections), freedom from leakage under pressure because of porosity and the complete elimination of costly repairs or rejections. Fabrication is shown in photos above.

1. Hollow forging for shell section being hot worked on mandrel.
2. Hollow and upset forgings assembled for automatic welding.
3. Complete welded cylinder being rough turned in 80" engine lathe.

Let Titusville Forge build your hydraulic cylinders—to your most exacting requirements.



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NEW EQUIPMENT

Fog nozzles

Hard rubber fog nozzles are non-clogging, corrosion resistant with practically any spray and long-wearing. They are recommended for use where corrosive conditions make metal impractical and where



nozzles of other non-metallic material are unsuited because of chemical properties, high temperature or cost. Thread connection for the smaller sizes is $\frac{3}{8}$ -in. male pipe thread, $\frac{1}{2}$ -in. male pipe thread for the larger sizes. *Bete Fog Nozzle, Inc.*

For more data circle No. 42 on postcard, p. 153

Subminiature motor

This high precision, sub-miniature unit, has been added to a line of standard servo motors. With nominal dimensions of only $\frac{5}{8}$ -in. diam x 1-in. long (plus shaft extension), this tiny motor weighs under one oz. Featuring extremely high torque to inertia ratio, it operates on 26v 400 cy, with a control volt-



age range of 0-26v. Typical characteristics include: $2\frac{1}{2}$ w input; $1/10$ w output; 0.063 in-oz stall torque; 8800 rpm no load speed; 0.00038 oz-in² rotor inertia; and 64,000 rad/sec² theoretical acceleration at stall; ambient range is -75 to +200°F. The motor is available with smooth or splined shafts. *Ford Instrument Co.*

For more data circle No. 43 on postcard, p. 153



**"My men weld twice
as fast with Airco
Easyarc 12 rods"**

The thick powdered metal coating on the Easyarc 12 electrode provides welding speeds that are about twice that of a conventional electrode, and results in excellent arc characteristics and ease of operation. Beads are very smooth and of good appearance. Slag removal is so much easier that definite savings in time are achieved. In welding mild steel, Easyarc 12 is excellent on build-up applications.

This is but one of many electrodes in Airco's complete line that also includes stainless steel, hard-facing, cast iron, general and special purpose electrodes. Send for free Airco Electrode Guide which will help you select the right electrode for your specific job. Request catalog 1318-1A.



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NEW EQUIPMENT

Molding press

This hydraulic plastics molding press has a bed and platen area of 100 x 192-in. It is big enough to hold a full sized automobile with room to spare. Total weight of the press is 400,000 lb. In design, the press is of the four housing type with pre-shrunk tie rods. Square gibs provide eight bearing surfaces for ram travel during press operation. Work is performed



with reinforced plastics. The press is fully adjustable to allow compensation of bearing surface clearance necessary because of expansion and contraction during hot forming operations. This feature will enable piece parts to be held to close tolerances. Construction of the press allows easy accessibility from any side. Parts larger than the press bed may be formed without difficulty. *Verson Allsteel Press Co.*

For more data circle No. 44 on postcard, p. 153

Power-unit bases

A "wrap-around" base and fuel tank combination has been developed for use with one manufacturer's diesel power units and electric sets. They include extended and short base versions, a short base model and electric set bases. They replace steel channel models formerly used. The streamlined, space-saving design features a greater fuel capacity, lighter weight and sturdier, more rigid construction. *Caterpillar Tractor Co.*

For more data circle No. 45 on postcard, p. 153

**Fast
Delivery**

Quality



**SIMONDS
INDUSTRIAL
CUT GEARS**

- ★ **FINISHED GEARS**
- ★ **CUSTOM GEAR CUTTING**
- ★ **HEAT-TREATED, CASE OR
FLAME-HARDENED**

You are sure of quality and prompt service when you place your industrial cut gear requirements with SIMONDS GEAR. We produce the full range of sizes in the types and materials you need from your blanks or ours. Let us quote on your next gear requirements.

* * *

*Stock carrying distributors of
Ramsey Silent Chain Drives and
Couplings; and industrial V-belts.*

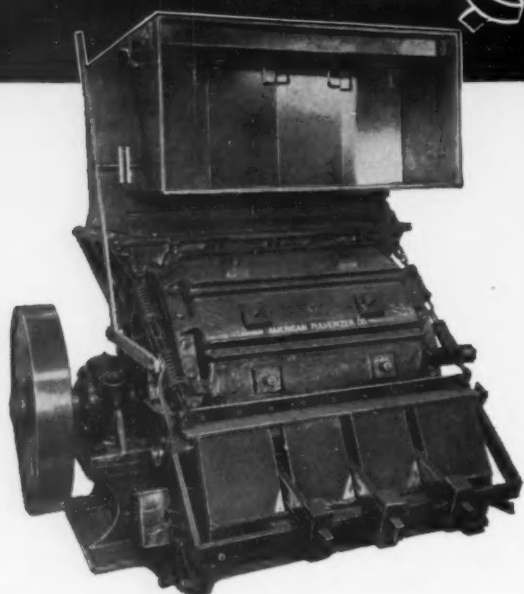
SPUR GEARS
BEVEL GEARS
MITRE GEARS
WORMS • WORM GEARS
RACKS • PINIONS
Cast or forged steel,
gray iron, bronze,
Meehanite, rawhide
or bakelite



**THE
SIMONDS
GEAR & MFG. CO.**

LIBERTY at 25TH PITTSBURGH 22, PA.
Quality Gears for over 60 years

Here's A Curly Cue To New Market Value For Your Machine Turnings



American METAL TURNINGS *Crusher*

That single machine turning of curled-up steel shown above can be mighty troublesome and costly to your operations.

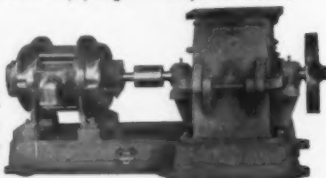
Gnarled up with thousands of others like itself, it becomes a problem in space . . . gallons of re-usable cutting oil are trapped in the folds . . . and the scrap value is greatly minimized.

Answer? Run this tangled waste through an efficient, AMERICAN METAL TURNINGS CRUSHER. Out come sized chips that are easy to handle for shoveling or pneumatic handling . . . easy to store (savings in space up to 75%) . . . easy to spin for oil recovery . . . and crushed turnings command a higher price.

The cost is easy, too, on your scrap recovery program. Pays for itself. WRITE for illustrated literature.

RECLAIM FUSED WELDING FLUX

American Hammermill reduces fused flux to fine regranulation for perfect re-use. Why throw away profits! Details on request.



American
PULVERIZER COMPANY

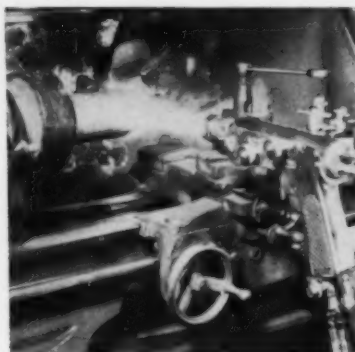
WRITE for Coal Crushing Bulletin

1439 MACKLIND AVE. • ST. LOUIS 10, MO.

NEW EQUIPMENT

Spray unit

A new metal spray unit applies hard-facing alloys and other metals in powder form. It features improved metal flow rates and increased deposit efficiency with no sacrifice in quality of the sprayed deposit. The model is designed for use in applying hard-facing powders to most types of steel (including stainless steel), cast iron and copper parts by the



Sprayweld process. In this process, powdered alloys are first applied by spraying and then are fusion-bonded to the part by heating with an oxy-acetylene flame. The complete unit includes a lightweight (3-lb) aluminum pistol, a chromium-plated hopper, a carburetor, a combination air regulator-filter, and suitable oxygen, acetylene and powder hoses and fittings. The Colmonoy Corp.

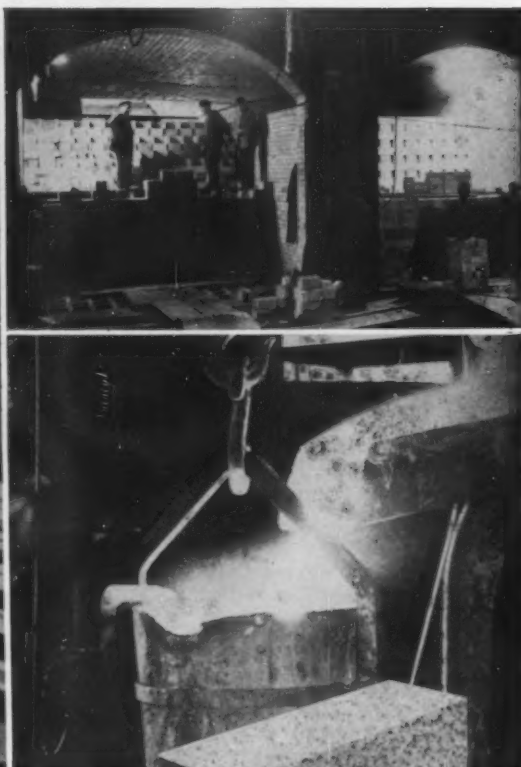
For more data circle No. 46 on postcard, p. 153

Lift-truck

With a 10,000-lb. capacity, an electric powered high-lift platform truck features two-wheel drive, six-wheel steer. It is hydraulically actuated, and is of the end-control, stand-up, non-telescopic type. For service under severe operating conditions, the new model has a frame built of heavy steel plate formed and electrically welded. Center sill type construction is used, with all major units attached directly to the heavily reinforced alloy steel bars which form the sills. An automatic unloading device prevents damage when the platform reaches its limit or if it strikes an obstruction. Elwell-Parker Electric Co.

For more data circle No. 47 on postcard, p. 153

Profitable trends in the use of refractories



Laclede-Christy offers simplified way to get exact-purpose fire brick

It's highly profitable, of course, to use refractories exactly suited to each application. There's a simple way to do this. That is to rely upon one source which offers you each refractory type and grade you may need—plus the quality and service you expect.

Laclede-Christy produces 68 different varieties of fire brick and other refractories—to meet a wide temperature range. From this outstanding selection you are certain to obtain the types and grades that serve your needs best.

Laclede offers you refractories custom-typed for your use—not just a product line. Laclede brands such as Spallac, King, Laclede 70, Peerlac, Wallac, Canon City, Marvel and Clearco justify their excellent reputation and acceptance. Laclede checker brick, cupola blocks, tile and many other items also meet Laclede's and your "quality-first" standards.

If you need help to determine your exact-purpose fire brick, Laclede-Christy offers that too. So, for a profitable trend in your use of refractories, get together with Laclede soon. Your representative is nearby.



LACLEDE-CHRISTY COMPANY

DIVISION OF H. K. PORTER COMPANY, INC.

2000 Hampton Avenue • St. Louis 10, Missouri

it's NEW...
it's WIDE...
it's BRIGHT



MicroRold[®]
**STAINLESS
SHEET**

Type 430 Bright Finish

up to 48" WIDE



BRIGHTER THAN EVER!—MicroRold stainless steel Type 430 in the NEW Bright Finish is now immediately available in sheets up to 48" wide offering new usefulness and economy in stainless fabrication. Produced with the same micro-accuracy of gauge for which MicroRold 36" is well known, Type 430 Bright up to 48" wide gives greater latitude in applications for quality stainless steel.

MicroRold 430 is also available in the regular commercial finishes and MicroRold stainless in other grades are now produced up to 48" wide. Complete details sent on request.

11-L

**Washington Steel
Corporation**

WOODLAND AVENUE

WASHINGTON, PA.

The Iron Age SUMMARY...

Egyptian shooting tightens steel market . . . Purchasing agents revise inventory thinking . . . Storm signals in view on most products . . . Demand trend up.

Suez Tightens Market . . . The on-again-off-again hot war in Egypt is tightening up the steel market even further this week. Edgy steel buyers are taking no chances. They figure inventories are money in the bank regardless of whether peace is restored or fighting spreads.

As a result, storm signals are going up on products that a few weeks ago were in relatively easy supply. Cold-rolled sheets, for example. The automotive juggernaut is beginning to roll. Detroit purchasing agents are reversing their casual attitude toward steel stocks. One major car producer has upped his production sights immediately.

The shooting over Suez has injected a feeling of urgency into the market. Steel consumers are hoping for the best but preparing for any eventuality. The proposal to build 50 large oil tankers is just one example. The heavy backlog of freight car orders is another. Even though the odds are against government controls to support these and other urgent programs, heavy tonnages of steel would have to be channeled to them—in one way or another.

Export Demand Strong . . . Domestic demand gives no sign of easing. In fact, the trend is the other

way. And automotive is set to provide the kicker. The oil and gas industry is clamoring for all the tubing it can get—and complaining that steel shortages have been a handicap to them during the last 10 years.

Export demand is strong, but foreign consumers have little chance of obtaining more than nominal shipments from U. S. producers. One mill has turned down a British order for 50,000 tons of bars.

It is certain that many heavy demand patterns will converge on the steel industry during December and the first quarter. Incoming orders are running as much as 10 to 15 pct ahead of capacity in some firms. That figure is expected to move up in the coming weeks.

Materials Outlook . . . Mills are doing all they can to weed out excess or duplicate tonnages. Orders actually getting on the books represent down-to-earth business with all the water squeezed out.

With it all, the steel industry is in no danger of raw material shortages. Manganese supplies are believed ample when stockpile tonnage is included. Iron ore is no problem. Tin might present some problems, but not immediately.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,474	2,474	2,498	2,296
Ingot Index (1947-1949=100)	154.0	154.0	155.5	147.5
Operating Rates				
Chicago	100.0	100.0*	102.0	99.0
Pittsburgh	97.0	102.0*	100.0	101.0
Philadelphia	103.0	105.0*	104.0	102.0
Valley	99.0	99.0*	98.0	99.0
West	100.0	97.0*	105.0	99.0
Detroit	103.0	104.0	105.0	96.0
Buffalo	105.0	105.0	105.0	105.0
Cleveland	103.0	99.0*	104.0	102.5
Birmingham	96.0	96.0	96.0	94.5
S. Ohio River	95.0	96.0*	97.0	95.0
Upper Ohio R.	105.0	103.0*	106.0	104.0
St. Louis	107.0	107.0	103.0	98.0
Northeast	100.0	100.0	100.0	97.0
Aggregate	100.5	100.5	101.5	99.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.622	5.622	5.622	5.174
Pig Iron (Gross Ton)	\$63.04	\$63.04	\$63.04	\$59.09
Scrap, No. 1 hvy (gross ton)	\$61.17	\$59.83	\$56.17	\$45.17
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	24.40
Copper, electrolytic	40.00	40.00	40.00	43.00
Lead, St. Louis	15.80	15.80	15.80	15.30
Magnesium ingot	36.00	36.00	36.00	33.25
Nickel, electrolytic	64.50	64.50	64.50	64.50
Tin, Straits, N. Y.	107.00	111.25	106.75	96.875
Zinc, E. St. Louis	13.50	13.50	13.50	13.00

*Revised

Cold-Rolled Sheet Tightens

With more buying by the carmakers, order books are practically filled on c-r through February . . . Automakers now taking firmer buying policy . . . Warehouses in market, too.

◆ **PREVIOUS SLACKNESS** in the market for cold-rolled sheet is disappearing fast as auto industry buying increases.

Despite a few deferments on December orders from the carmakers, most mills indicate that order books on c-r sheet are filled for the first two months of next year. The main factor in initial auto industry underpurchasing seems to have been production snags.

Indications now are that in cold-rolled sheet, and other products, the auto industry is adopting a firmer approach toward ordering. Clearer analysis of production needs, desire to maintain inventories or increase them, plus an awareness that international political tensions could tighten market still further seem back of this changing attitude.

Warehouses, too, are beginning to admit that they're on the lookout for cold-rolled, asking some mills for additions to their first quarter quotas. Apparently, many warehouses had built large cold-rolled inventories before the strike, grew concerned afterwards when demand didn't pick up as fast or as heavily in that area as it did on other grades. Now the situation is straightening out and they're on the prowl for more sheet.

Here's the market picture by products:

PLATE AND STRUCTURALS . . . Contractors at Pittsburgh are being quoted by producers at anywhere from six to 14 months on delivery of structurals. By splitting orders on small jobs up between warehouses, they can get delivery in six months. However, larger jobs, calling for mill shipments, mean a delivery schedule of 9 to 14 months.

At Detroit situation is critical. Customers are talking more and more about some kind of government allocation of existing supply.

More and more requests for plate conversion are coming into the Chicago area and producers there expect to have plenty of this business, all they can handle in fact, at least through the first half of '57. Some consumers are already claiming they can't find anyone to accept orders for conversion plate for third quarter delivery. Conversion orders are coming from out of the area.

SHEET AND STRIP . . . At Chicago both cold-rolled sheet and strip are gone for the first quarter. Hot-rolled products are already tight and will get worse in next quarter. There will be a minimum two-week carryover in these items at the beginning of January with some mills probably having a four-week holdover.

Auto producers are now taking 80 to 90 pct of the cold-rolled sheet required for full production in the Pittsburgh market area. One large producer is carrying December hot-rolled sheet orders over to January.

Cold-rolled sheet schedules at Cleveland are booked substantially into January and February. Some few deferments of December into January and January into February are now being rescinded. Auto firms are increasing their production schedules, so the

outlook is for a continued tight market on sheets through February.

Hot-rolled sheet is very tight at Detroit because of mill concentration on other items. One mill is sold out on cold-rolled sheet in January and reports more business than it can handle. Strip market is picking up generally.

BARS . . . Carbon bars are developing into one of the tightest items in the Detroit market. Situation is especially bad for the smaller sizes.

Bar market is also tight at Cleveland with producers able to sell more than they can produce for months ahead. Carryovers of two weeks into January are expected. Where producers do find sluggishness in cold-finished bar market they are diverting more steel into hot-rolled bars. There's strong export demand in the Cleveland area which is largely ignored by Ohio producers. One mill got inquiries from Great Britain for up to 50,000 tons of bars and requests from Japan for up to 2000 tons at a time. Mills are only allocating a small percentage of output for export.

Carryovers on hot-rolled bars average 2-6 weeks at Chicago. While cold finishers are still quoting two-week delivery, this can run to six weeks and better where special finish or treating is required.

OTHER PRODUCTS . . . Stainless: Producers at Pittsburgh report they are in good shape for the balance of the year except in strip. There's good demand for chrome stainless at Detroit. In both areas, as elsewhere, producers are interested in increasing their nickel supply, but don't see much chance of any relief.

Pipe and Tubing: Oil country goods are strong, Pittsburgh reports, with welded pipe orders coming in at a good rate for first quarter of next year. National Tube Div. of U. S. Steel has changed its quantity extras to eliminate the flat 6 pct established last December on quantities of less than a ton when shipped in carloads with other items. New system employs a point scale which varies according to the quantity and size of pipe shipped.

Wire: Pickup in manufacturers' wire noted as increased auto orders in Cleveland area filter down through the suppliers to the producers.

Semi-finished steel: Mill buying and selling of semi-finished steel continues at increased volume. At Chicago billet stock is being shipped in from as far as several hundred miles away.

Purchasing Agent's Checklist

SPECIAL REPORT: Conveyors move men, not just materials. . . . p. 91

FUEL: Is oil country goods capacity adequate? p. 93

MARKETING: Survey shows more stainless is being distributed through warehouses p. 94

MARKETING: Gearmakers chalk up record sales p. 100

Comparison of Prices

(Effective Nov. 13, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.
Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Nov. 13 1956	Nov. 6 1956	Oct. 16 1956	Nov. 13 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.825¢
Cold-rolled sheets	5.75	5.75	5.75	5.825
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.825
Cold-rolled strip	6.870	6.870	6.870	6.29
Plate	4.87	4.87	4.87	4.82
Plates, wrought iron	10.40	10.40	10.40	9.80
Stainl's C-B strip (No. 302)	47.50	47.50	47.50	44.50

Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	\$9.95	\$9.95	\$9.85	\$9.05
Tinplates, electro (0.50 lb.)	8.65	8.65	8.55	7.75
Special coated mfg. terms	9.20	9.20	9.10	7.95

Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	40.75	40.75	40.75	38.25
Wrought iron bars	11.50	11.50	11.50	10.40

Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.25¢

Rails: (per 100 lb.)				
Heavy rails	\$5.075	\$5.075	\$5.075	\$4.735
Light rails	6.00	6.00	6.00	5.65

Semifinish Steel: (per net ton)				
Re-rolling billets	\$74.00	\$74.00	\$74.00	\$68.50
Slabs, re-rolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00

Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.225	4.225	4.225	4.225

Finished Steel Composite: (per pound)				
Base price	5.622¢	5.622¢	5.622¢	5.174¢

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

	Nov. 13 1956	Nov. 6 1956	Oct. 16 1956	Nov. 13 1955
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	\$67.76	\$67.76	\$67.76	\$63.69
Foundry, Valley	63.00	63.00	63.00	59.00
Foundry, Southern Cin'ti	67.17	67.17	67.17	62.93
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	63.00	63.00	63.00	59.00
Basic del'd Philadelphia	66.84	66.84	66.84	62.77
Basic Valley furnace	62.50	62.50	62.50	58.50
Malleable, Chicago	63.00	63.00	63.00	59.00
Malleable, Valley	63.00	63.00	63.00	59.00
Ferromanganese, cents per lb.	11.75¢	11.75¢	11.75¢	9.50¢
74 to 76 pct Mn base.				

Pig Iron Composite: (per gross ton)				
Pig iron	\$63.04	\$63.04	\$63.04	\$59.09

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	\$62.50	\$61.50	\$55.50	\$45.50
No. 1 steel, Phila. area	58.50	57.50	56.50	46.50
No. 1 steel, Chicago	62.50	60.50	56.50	43.50
No. 1 bundles, Detroit	60.50	60.50	56.50	40.00
Low phos., Youngstown	68.50	68.50	64.50	49.00
No. 1 mach'y cast, Pittsburgh	61.50	61.50	59.50	52.50
No. 1 mach'y cast, Philadel'a.	58.00	58.00	58.00	48.50
No. 1 mach'y cast, Chicago	58.50	56.50	56.50	53.50

Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	\$61.17	\$59.53	\$56.17	\$45.17

Coke, Connellville: (per net ton at oven)				
Furnace coke, prompt	\$15.50	\$14.50	\$14.50	\$14.25
Foundry coke, prompt	\$18.19	\$17.18	\$17.18	\$16.25

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	40.00	40.00	40.00	43.00
Copper, Lake, Conn.	40.00	40.00	40.00	43.00
Tin, Straits, New York	107.00†	111.25	106.75	96.875
Zinc, East St. Louis	18.50	18.50	18.50	13.00
Lead, St. Louis	18.80	18.80	18.80	15.00
Aluminum, virgin ingot	27.10	27.10	27.10	24.40
Nickel, electrolytic	64.50	64.50	64.50	64.50
Magnesium, ingot	36.00	36.00	36.00	33.25
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

←To identify producers, see Key on P. 202→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem B3	64.50	65.00	65.50	66.00	67.50†
Birdsboro, Pa. B6	64.50	65.00	65.50	66.00	67.50†
Birmingham R3	58.50	59.00*	60.00	61.00	62.00
Birmingham W9	58.50	59.00*	60.00	61.00	62.00
Birmingham U4	62.50	63.00	63.50	64.00	65.00
Buffalo R3	62.50	63.00	63.50	64.00	65.00
Buffalo H1	62.50	63.00	63.50	64.00	65.00
Buffalo W6	62.50	63.00	63.50	64.00	65.00
Chester P2	64.50	65.00	65.50	66.00	67.50†
Chicago I4	62.50	63.00	63.50	64.00	65.00
Cleveland A5	62.50	63.00	63.50	64.00	65.00
Cleveland R3	62.50	63.00	63.50	64.00	65.00
Dubuok I4	62.50	63.00	63.50	64.00	65.00
Erie I4	62.50	63.00	63.50	64.00	65.00
Everett M6	63.75	64.25	64.75	65.25	66.75
Fontana K1	70.00	70.50	71.00	71.50	72.50
Geneva, Utah C7	62.50	63.00	63.50	64.00	65.00
Granite City G2	64.40	64.90	65.40	65.90	66.90
Hubbard Y1	58.50	59.00*	60.00	61.00	62.00
Lane Star J1	62.50	63.00	63.50	64.00	65.00
Minnequa C6	64.50	65.00	65.50	66.00	67.50†
Monessen P6	62.50	63.00	63.50	64.00	65.00
Neville Is. P4	62.50	63.00	63.50	64.00	65.00
N. Tonawanda T1	62.50	63.00	63.50	64.00	65.00
Pittsburgh U1	62.50	63.00	63.50	64.00	65.00
Sharpsville S3	62.50	63.00	63.50	64.00	65.00
So. Chicago R3	62.50	63.00	63.50	64.00	65.00
Stettin B3	64.50	65.00	65.50	66.00	67.50
Svealand A2	64.50	65.00	65.50	66.00	67.50
Toledo I4	62.50	63.00	63.50	64.00	65.00
Troy, N. Y. R3	64.50	65.00	65.50	66.00	67.50
Youngstown Y1	62.50	63.00	63.50	64.00	65.00

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.80 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, \$2 per ton for 0.5 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel.
* Add \$1.00 for 0.31-0.49 pct phos. † Intermediate low phos.
‡ Add \$1.00 for 0.31 to 0.50 pct phos.
Silvery iron: Buffalo, H1, \$72.50; Jackson, J1, I4 (Globe Div.), \$71.50; Niagara Falls (15.01-15.50), \$99.50; Kewuk (14.01-14.50), \$102.00; (15.51-16.00), \$105.00. Add \$1.25 per ton for each 0.50 pct silicon over base (0.01 to 0.50 pct) up to 14 pct. Add 75¢ for each 0.50 pct manganese over 1.8 pct. Bessemer ferro-silicon: \$64.00.

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingot, re-rolled	19.75	21.00	20.50	22.00	—	23.25	35.25	28.25	32.75	—	16.00	27.75	16.25
Slabs, billets	24.50	27.25	25.25	28.00	28.50	29.25	44.50	35.75	42.00	—	28.75	—	21.00
Billets, forging	—	33.00	33.75	34.00	37.00	36.00	56.25	42.25	50.25	38.75	27.25	27.75	27.75
Bars, struct.	39.00	39.25	40.50	40.75	43.75	43.00	66.75	50.25	59.00	36.25	32.50	33.00	33.00
Plates	—	41.25	42.50	43.00	45.50	45.75	70.25	54.50	63.75	38.75	33.75	35.50	34.50
Sheets	45.00	45.25	47.25	47.50	55.75	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Strip, hot-rolled	33.00	35.75	34.00	36.75	—	39.75	63.50	48.75	58.25	—	29.75	—	30.75
Strip, cold-rolled	41.50	45.25	43.75	47.50	52.00	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Wire CF; Rod HR	—	37.25	38.35	38.75	41.50	40.75	63.50	48.00	56.25	34.50	31.00	31.50	31.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; Vandergrift, Pa., U1; Washington, Pa., W2, J2; Baltimore, Md., J1; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Ft. Wayne, Ind., J4; Philadelphia, D5.

Strip: Midland, Pa., C11; Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Lechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, Md., M2; Canton-Massillon, O., R3; Harrison, N. Y., J3; Youngstown, C3; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (plus further conversion extra); W1 (25¢ per lb. higher); New Bedford, Mass., R6; Gary, U1 (25¢ per lb. higher).

Bar: Baltimore, Md., J1; S. Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; S. Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T3; Ft. Wayne, Ind., J4; Philadelphia, D5; Detroit, R3; Gary, U1.

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, Ind., J4; Harrison, N. Y., J3; Baltimore, Md., J1; Dunkirk, A3; Monessen, Pa., F1; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, Md., J1; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11; S. Chicago, U1.

Plates: Brackenridge, Pa., A3; Chicago, Ill., U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Middletown, Md., J1; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15; Philadelphia, D5; Vandergrift, Pa., U1; Gary, U1.

Forgings: Midland, Pa., C11; Baltimore, Md., J1; Washington, Pa., J2; McKeesport, Pa., F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11; Detroit, R3; Munhall, Pa., S. Chicago, U1.

Scrap Shortage Threatened

Record high prices fail to bring out scrap . . . Orders go unfilled in spite of unprecedented price levels . . . Composite continues climb . . . New pressure for export controls.

◆ **THE MARKET** continues to soar to unheard-of heights, bringing with new price records the ominous threat of a severe scrap shortage.

Prices continue to climb and demand remains strong. But even these all time record prices fail to bring out quantities of good scrap. One answer is that the scrap just isn't there, regardless of price.

Although the strong market is universal, the real strength is centered in the Midwest. But in Chicago, soaring prices are still unable to keep the scrap home and much is going out of district. Attempts to beat down prices have met with little success.

Reports of a glut in East Coast because of lack of shipping space for export are generally unconfirmed. The slight shortage of bottoms is seasonal, because of heavy grain and coal exports, not traced directly to the international situation.

The only hopeful note on supply comes from Detroit, where booming auto production will bring more industrial list scrap onto the market.

It is expected that the tense international situation and the out-of-sight level of scrap prices will bring renewed pressure for controls on scrap export. Meanwhile, the market indicates it will remain at its present level for some weeks at least.

In line with the advancing prices in all major markets, THE IRON AGE Composite Price continued its climb past all previous records, easily passing the \$60 mark for the first time in history and continuing on up to \$61.17.

Pittsburgh . . . Prices of No. 1 steel-making grades moved up \$1 as dealers

are being quoted higher prices on track for shipment out of the district. Railroad specialties are also up \$1 on the basis of latest lists. Rails two ft and under are up \$3 on the same list. The market is strong, but relatively quiet. High prices have not brought good scrap into dealer yards in any great quantities. Competition for available tonnages is sharp, but is not producing a heavy flow of material. Some contend that there is an actual shortage of scrap.

Chicago . . . Consumer prices edged up across the board while brokers attempt to fill orders in a market that seems to have gone wild. Broker buying, after advancing as much as three times in one day, has been followed by a mild period of quiet as attempts were made to find a level that would be in line with mill offers. Reports of prices well ahead of most quoted prices were indicative of the wild scattering of broker buying prices. Fresh attempts to beat down buying price levels met with little success.

Philadelphia . . . Price of steelmaking grades climbed another dollar in spite of reports that a shortage of shipping space was choking eastern ports with scrap. Broker purchases of bundles were responsible for a \$1 increase in that grade and low phos, and some railroad specialties went up \$2. Although fairly quiet, there is an underlying feeling of strength here.

New York . . . Prices of steelmaking grades rose another \$1. The market continues strong on the basis of buying by adjacent mills and new pressure from export.

Detroit . . . The market continues to show strength, although no new orders have been placed here. Some brokers have stopped buying No. 2 heavy melting, but this is considered a temporary move. The trade is confident that even higher prices will

result from end of the month sales in view of the continued high operating rate, although there will also be an increase in amount of scrap generated.

Cleveland . . . Competition among brokers to cover new orders edged Valley prices up another 50¢ for No. 1 grades and secondary grades a full \$2. Secondary grades may be in for a new increase if the boom continues. One market dampener in the area is loss of some openhearth for rebuilding.

Birmingham . . . The usual seasonal slowdown in cast iron pipe orders has weakened the cast scrap market in this area. Some pipe foundries are operating only three days a week and only two of the major cast consumers are buying normal amounts. No change is expected until after the winter months.

St. Louis . . . The scrap market continues strong and has been somewhat speculative. Steel mills have not gone along with increases in other markets, and prices are unchanged. Receipts continue to be adequate with favorable weather conditions prevailing. Cast grades are weak, dropping somewhat in price.

Cincinnati . . . Foundries are starting to look around for cheaper grades of scrap because of competition with re-rolling mills for rails. In recent railroad sales, random length rails brought more than short cut rails, although traditionally cost of cutting is about \$5 to \$7 per ton. Steel market remains firm, with brokers reaching for dealer scrap to fill orders.

Buffalo . . . The tone of the market is very strong, in spite of absence of recent local sales. Steelmaking grades are up \$1 on appraisal, with probable further increase ahead in the strong market.

Boston . . . Export is strong, but would be even more active except that a shortage of gondola cars handicaps rail shipment. Local mills are in the market, bringing prices of steel-making and blast furnace grades up \$1 in most cases. Cast is also up.

West Coast . . . Mills have good inventories, but prices remain at near-record highs. Export demand is strong and keeps the market buoyant. Due to transformer trouble, one mill will operate at only 50 pct of capacity until Jan. 1.



Hydrocrane's Working Boom Hoist Speeds Scrap Metal Handling

With the Hydrocrane, any boom angle is a working position because the boom is raised or lowered dozens of times a day as part of the crane's regular operating cycle. Even with full load suspended you can raise or lower the boom, and swing or telescope at the same time, with the precise control that only the Hydrocrane offers. It's just one of the many unique time-saving features that make the Hydrocrane ideal for scrap handling.

You also gain many advantages working in confined areas. The Hydrocrane's working boom hoist, together with the line hoist, makes it easy to lift loads over stockpiled materials or under wires, miss columns as it swings to truck, or stockpile. The Hydrocrane's rugged outriggers, which permit conventional motor truck mounting, give you the unusual combi-

nation of high capacity and top mobility. Extremely short tail swing (about 4½ feet) lets you put the crane in the tightest spots.

Hydrocrane maneuverability and multi-job versatility make this crane a money-saving investment in any scrap yard. Hydrocrane travel speed and low-cost operation coupled with the unique operating characteristics described above put this machine way out front for scrap recovery and salvage operations. Your Bucyrus-Erie distributor will be happy to demonstrate either the 10-ton H-5 or 5-ton H-3 at your convenience.

141H56



SOUTH MILWAUKEE, WISCONSIN

Scrap Prices (Effective Nov. 12, 1956)

Pittsburgh

No. 1 hvy. melting.....	\$62.00 to \$63.00
No. 2 hvy. melting.....	53.00 to 54.00
No. 1 bundles.....	62.00 to 63.00
No. 1 factory bundles.....	75.00 to 76.00
No. 2 bundles.....	49.00 to 50.00
Machine shop turn.....	41.00 to 42.00
Mixed bor. and turn.....	41.00 to 42.00
Shoveling turnings.....	46.00 to 47.00
Cast iron borings.....	46.00 to 47.00
Low phos. punch'g plate.....	71.00 to 72.00
Heavy turnings.....	55.00 to 56.00
No. 1 RR. hvy. melting.....	69.00 to 70.00
Scrap rails, random lgth.....	78.00 to 79.00
Rails 2 ft and under.....	82.00 to 83.00
RR. steel wheels.....	74.00 to 75.00
RR. spring steel.....	74.00 to 75.00
RR. couplers and knuckles.....	74.00 to 75.00
No. 1 machinery cast.....	61.00 to 62.00
Cupola cast.....	53.00 to 54.00
Heavy breakable cast.....	51.00 to 52.00

Chicago

No. 1 hvy. melting.....	\$62.00 to \$63.00
No. 2 hvy. melting.....	53.00 to 54.00
No. 1 factory bundles.....	69.00 to 70.00
No. 1 dealers' bundles.....	62.00 to 64.00
No. 2 dealers' bundles.....	47.00 to 48.00
Machine shop turn.....	41.00 to 42.00
Mixed bor. and turn.....	43.00 to 44.00
Shoveling turnings.....	44.00 to 45.00
Cast iron borings.....	43.00 to 44.00
Low phos. forge crops.....	74.00 to 75.00
Low phos. punch'g plate.....	71.00 to 72.00
Low phos. 3 ft and under.....	69.00 to 70.00
No. 1 RR. hvy. melting.....	69.00 to 70.00
Scrap rails, random lgth.....	79.00 to 80.00
Rerolling rails.....	90.00 to 91.00
Rails 2 ft and under.....	88.00 to 89.00
Locomotive tires, cut.....	74.00 to 75.00
Cut bolsters & side frames.....	74.00 to 75.00
Angles and splice bars.....	79.00 to 80.00
RR. steel car axles.....	92.00 to 93.00
RR. couplers and knuckles.....	73.00 to 74.00
No. 1 machine cast.....	58.00 to 59.00
Cupola cast.....	53.00 to 54.00
Heavy breakable cast.....	48.00 to 50.00
Cast iron brake shoe.....	49.00 to 50.00
Cast iron wheels.....	58.00 to 60.00
Malleable.....	73.00 to 74.00
Stove plate.....	49.00 to 50.00
Steel car wheels.....	74.00 to 75.00

Philadelphia Area

No. 1 hvy. melting.....	\$58.00 to \$59.00
No. 2 hvy. melting.....	48.00 to 49.00
No. 1 bundles.....	58.00 to 59.00
No. 2 bundles.....	48.00 to 49.00
Machine shop turn.....	41.00 to 42.00
Mixed bor. short turn.....	40.00 to 41.00
Cast iron borings.....	40.00 to 41.00
Shoveling turnings.....	44.00 to 45.00
Clean cast chem. borings.....	48.00 to 49.00
Low phos. 5 ft and under.....	62.00 to 63.00
Low phos. 2 ft and under.....	63.00 to 64.00
Low phos. punch'g.....	63.00 to 64.00
Elec. furnace bundles.....	60.00 to 61.00
Heavy turnings.....	53.00 to 54.00
RR. steel wheels.....	71.00 to 72.00
RR. spring steel.....	71.00 to 72.00
Rails 18 in. and under.....	82.00 to 83.00
Cupola cast.....	62.00 to 64.00
Heavy breakable cast.....	55.00 to 57.00
Cast iron car wheels.....	64.00 to 65.00
Malleable.....	68.00 to 69.00
Unstripped motor blocks.....	44.00 to 45.00
No. 1 machinery cast.....	57.00 to 59.00

Cleveland

No. 1 hvy. melting.....	\$64.50 to \$65.50
No. 2 hvy. melting.....	48.00 to 49.00
No. 1 bundles.....	64.50 to 65.50
No. 1 factory bundles.....	71.00 to 72.00
No. 2 bundles.....	41.00 to 42.00
No. 1 busheling.....	64.50 to 65.50
Machine shop turn.....	34.00 to 35.00
Mixed bor. and turn.....	38.00 to 39.00
Shoveling turnings.....	38.00 to 39.00
Cast iron borings.....	38.00 to 39.00
Cut struct'l & plates, 2 ft & under.....	67.00 to 68.00
Drop forge flashings.....	65.50 to 66.50
Low phos. punch'g plate.....	65.50 to 66.50
Foundry steel, 2 ft & under.....	62.00 to 63.00
No. 1 RR. heavy melting.....	70.00 to 71.00
Rails 2 ft and under.....	83.00 to 84.00
Rails 18 in. and under.....	84.00 to 85.00
Railroad grate bars.....	49.00 to 50.00
Steel axle turnings.....	44.00 to 45.00
Railroad cast.....	61.00 to 62.00
No. 1 machinery cast.....	53.00 to 54.00
Stove plate.....	55.00 to 56.00
Malleable.....	71.00 to 72.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting.....	\$66.50 to \$67.50
No. 2 hvy. melting.....	52.00 to 53.00
No. 1 bundles.....	66.00 to 67.00
No. 2 bundles.....	47.00 to 48.00
Machine shop turn.....	34.00 to 35.00
Shoveling turnings.....	40.00 to 41.00
Cast iron borings.....	40.00 to 41.00
Low phos. plate.....	68.00 to 69.00

Buffalo

No. 1 hvy. melting.....	\$56.00 to \$57.00
No. 2 hvy. melting.....	46.00 to 47.00
No. 1 busheling.....	56.00 to 57.00
No. 1 bundles.....	56.00 to 57.00
No. 2 bundles.....	43.00 to 44.00
Machine shop turn.....	30.00 to 31.00
Mixed bor. and turn.....	32.00 to 33.00
Shoveling turnings.....	34.00 to 35.00
Cast iron borings.....	32.00 to 33.00
Low phos. plate.....	52.00 to 53.00
Scrap rails, random lgth.....	57.00 to 58.00
Rails 2 ft and under.....	77.00 to 78.00
RR. steel wheels.....	60.00 to 61.00
RR. spring steel.....	60.00 to 61.00
RR. couplers and knuckles.....	70.00 to 71.00
No. 1 machinery cast.....	52.00 to 53.00
No. 1 cupola cast.....	48.00 to 49.00

Detroit

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting.....	\$59.00 to \$60.00
No. 2 hvy. melting.....	50.00 to 51.00
No. 1 bundles, openhearth.....	60.00 to 61.00
No. 2 bundles.....	40.00 to 41.00
New busheling.....	59.00 to 60.00
Drop forge flashings.....	58.50 to 59.50
Machine shop turn.....	29.00 to 30.00
Mixed bor. and turn.....	32.00 to 33.00
Shoveling turnings.....	32.00 to 33.00
Cast iron borings.....	32.00 to 33.00
Low phos. punch'g plate.....	59.00 to 60.00
No. 1 cupola cast.....	51.00 to 52.00
Heavy breakable cast.....	44.00 to 45.00
Stove plate.....	45.00 to 46.00
Automotive cast.....	54.00 to 55.00

St. Louis

No. 1 hvy. melting.....	\$52.00 to \$53.00
No. 2 hvy. melting.....	45.00 to 46.00
No. 1 bundles.....	55.00 to 56.00
No. 2 bundles.....	41.00 to 42.00
Machine shop turn.....	36.50 to 37.50
Cast iron borings.....	38.50 to 39.50
Shoveling turnings.....	38.50 to 39.50
No. 1 RR. hvy. melting.....	62.50 to 63.50
Rails, random lengths.....	79.00 to 80.00
Rails 18 in. and under.....	83.00 to 84.00
Locomotive tires uncut.....	64.00 to 65.00
Angles and splice bars.....	68.00 to 69.00
Std. steel car axles.....	78.00 to 79.00
RR. specialties.....	66.50 to 67.50
Cupola cast.....	49.00 to 50.00
Heavy breakable cast.....	44.50 to 45.50
Cast iron brake shoes.....	50.00 to 51.00
Stove plate.....	43.00 to 44.00
Cast iron car wheels.....	56.00 to 57.00
Rerolling rails.....	88.00 to 89.00
Unstripped motor blocks.....	43.00 to 44.00

Boston

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting.....	\$51.00 to \$52.00
No. 2 hvy. melting.....	39.00 to 40.00
No. 1 bundles.....	51.00 to 52.00
No. 2 bundles.....	37.50 to 38.50
No. 1 busheling.....	51.00 to 52.00
Elec. furnace, 3 ft & under.....	53.00 to 54.00
Machine shop turn.....	30.00 to 31.00
Mixed bor. and short turn.....	32.00 to 33.00
Shoveling turnings.....	34.00 to 35.00
Clean cast chem. borings.....	35.00 to 36.00
No. 1 machinery cast.....	46.00 to 47.00
Mixed cupola cast.....	42.00 to 43.00
Heavy breakable cast.....	44.00 to 45.00
Stove plate.....	40.00 to 41.00
Unstripped motor blocks.....	32.00 to 33.00

New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting.....	\$53.00 to \$54.00
No. 2 hvy. melting.....	43.00 to 44.00
No. 2 bundles.....	41.00 to 42.00
Machine shop turn.....	31.50 to 32.50
Mixed bor. and turn.....	31.50 to 32.50
Shoveling turnings.....	37.50 to 38.50
Clean cast chem. borings.....	35.00 to 36.00
No. 1 machinery cast.....	51.00 to 52.00
Mixed yard cast.....	47.00 to 48.00
Charging box cast.....	47.00 to 48.00
Heavy breakable cast.....	47.00 to 48.00
Unstripped motor blocks.....	37.00 to 38.00

Birmingham

No. 1 hvy. melting.....	\$43.00 to \$44.00
No. 2 hvy. melting.....	41.00 to 42.00
No. 1 bundles.....	43.00 to 44.00
No. 2 bundles.....	35.00 to 36.00
No. 1 busheling.....	43.00 to 44.00
Machine shop turn.....	34.50 to 35.50
Shoveling turnings.....	35.50 to 36.50
Cast iron borings.....	25.00 to 26.00
Electric furnace bundles.....	52.00 to 53.00
Bar crops and plate.....	59.00 to 60.00
Structural and plate, 2 ft.....	57.00 to 58.00
No. 1 RR. hvy. melting.....	56.00 to 57.00
Scrap rails, random lgth.....	69.00 to 70.00
Rails, 18 in. and under.....	74.00 to 75.00
Angles & splice bars.....	66.00 to 67.00
Rerolling rails.....	77.00 to 78.00
No. 1 cupola cast.....	51.00 to 52.00
Stove plate.....	51.00 to 52.00
Charging box cast.....	40.00 to 41.00
Cast iron car wheels.....	45.00 to 46.00
Unstripped motor blocks.....	44.00 to 45.00
Mashed tin cans.....	15.00 to 16.00
Elec. furnace, 3 ft & under.....	50.00 to 51.00

Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting.....	\$59.00 to \$60.00
No. 2 hvy. melting.....	49.00 to 50.00
No. 1 bundles.....	59.00 to 60.00
No. 2 bundles.....	43.00 to 44.00
Machine shop turn.....	39.00 to 40.00
Mixed bor. and turn.....	37.50 to 38.50
Shoveling turnings.....	42.00 to 43.00
Cast iron borings.....	39.50 to 40.50
Low phos. 18 in. & under.....	64.00 to 65.00
Rails, random lengths.....	72.00 to 73.00
Rails, 18 in. and under.....	79.00 to 80.00
No. 1 cupola cast.....	48.00 to 49.00
Hvy. breakable cast.....	47.00 to 48.00
Drop broken cast.....	58.00 to 59.00

San Francisco

No. 1 hvy. melting.....	\$54.00
No. 2 hvy. melting.....	52.00
No. 1 bundles.....	53.00
No. 2 bundles.....	43.00
Machine shop turn.....	35.00
Cast iron borings.....	35.00
No. 1 RR. hvy. melting.....	55.00
No. 1 cupola cast.....	60.00

Los Angeles

No. 1 hvy. melting.....	\$54.00
No. 2 hvy. melting.....	52.00
No. 1 bundles.....	53.00
No. 2 bundles.....	42.00
Machine shop turn.....	35.00
Shoveling turnings.....	38.00
Cast iron borings.....	35.00
Elec. furn. 1 ft and under (foundry).....	66.00
No. 1 RR. hvy. melting.....	54.00
No. 1 cupola cast.....	60.00

Seattle

No. 1 hvy. melting.....	\$54.00
No. 2 hvy. melting.....	51.00
No. 2 bundles.....	35.00
No. 1 cupola cast.....	55.00
Mixed yard cast.....	55.00

Hamilton, Ont.

No. 1 hvy. melting.....	\$52.00
No. 2 hvy. melting.....	47.00
No. 1 bundles.....	52.00
No. 2 bundles.....	40.50
Mixed steel scrap.....	46.00
Bushelings.....	39.50
Bush., new fact., prep'd.....	50.00
Bush., new fact., unprep'd.....	46.00
Machine shop turn.....	31.00
Short steel turn.....	35.00
Mixed bor. and turn.....	28.00
Rails, rerolling.....	60.00
Cast scrap.....	50.00

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Aluminum Supply Brighter

Alcoa president, I. W. Wilson, says supply outlook is the best yet . . . Predicts 3 million tons will be available by 1958 . . . No stockpile call first half 1957.

♦ THE SUPPLY outlook for aluminum consumers is the best it's been for several years. In fact, I. W. Wilson, president of Aluminum Co. of America, believes that it is the best in the history of the industry.

And backing up the Alcoa chief's contention is the fact that ODM will not issue any calls for primary aluminum during the first half of 1957 at least.

The conclusion, drawn by I. W. Wilson in his speech before a regional convention of the New York Society of Security Analysts, is that the bright outlook is clearing the way for more rapid development of new applications and markets for aluminum.

"Instead of being plagued with the problems of attempting to meet demand, as in the past, manufacturers should at last be able to design and use aluminum in new applications with confidence that the supply will be adequate," the Alcoa head declared.

While Mr. Wilson predicts the combination of domestic production, imports, and recovery of secondary metal will assure a three-million ton supply of aluminum in 1958, he points out that this doesn't mean that the industry has reached its peak. He expects aluminum consumption to exceed three million tons by 1960 and "likely to go to at least five million tons by 1975."

Meanwhile, Director of Defense Mobilization Arthur S. Flemming announced that the minimum objective for aluminum is in the national stockpile, consequently no metal will be purchased for the stockpile during the first half of 1957. This will make an additional 400 million lb of aluminum available. Mr. Flemming also reported

that long term objectives are by no means satisfied, but that the government does not see fit to buy in times of strong industrial demand.

At least one major producer considers this an implication that stockpiling will be renewed if demand does not match or exceed production. On this basis, the entire primary industry is expected to go full speed ahead with expansion and market development plans.

ALUMINUM . . . The R. S. Reynolds Memorial Award, sponsored by the Reynolds Metals Co., will be given annually to the architect who makes the most significant contribution to the use of aluminum in architecture. The prize is \$25,000—and a suitable emblem. This award combined with the publication of the two volume work called "Aluminum in Modern Architecture" is a major move by

Reynolds to develop the potential of the building trades as a market for aluminum. The company reports that it spent over \$500,000 in compilation, editing and publishing the work.

COPPER . . . Changing the rate of output of a major mine or smelter in the U. S. is no small task. But it seems that it is child's play when compared with the problems incurred in the major American subsidiary properties in Chile.

Late last week Anaconda announced that it will cut back its production from Chile (2/3 of the company's total output) by 15 pct by getting the Chilean union to cut out holiday and overtime work and by reducing the Sunday schedule at Chuquicamata.

Early this week the Chilean minister of mines asked the unions involved to renege on their agreement with Anaconda. The government statement insisted that it is vital that volume of copper deliveries to foreign markets be maintained.

The statement further promised that the government will attempt to find a satisfactory answer to the problems. However, what problems was not specified.

Through an oversight in revising the method of reporting daily and monthly average, the monthly average price of Lake Copper, delivered, for October was omitted. It was 39.409.

NICKEL . . . The government has drawn the line at direct loans in its program to create incentives for boosting the supply of nickel.

ODM currently allows rapid tax amortization, and offers government purchase contracts.

But it turned down flatly the request of a domestic company for a direct government loan.

TIN . . . The fate of the controversial Texas City Tin Smelter is still in doubt. The Federal Facilities Commission received bids from two private firms for purchase of the smelter.

Bidders were Wah Chang Corp., New York, and Ellis E. Patterson and S. Fishfader, Los Angeles, for an unidentified third party.

A Wah Chang representative reported that the firm has not decided what would be done with the plant, if its bid is accepted. However, he did indicate that the bid was made on the basis of the tin operations.

Tin prices for the week: Nov. 7—109.50; Nov. 8—109.50; Nov. 9—108.50; Nov. 10—108.50; Nov. 12—Holiday; Nov. 13—107.00*.
*estimate

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum ingot	27.10	25.90	8/10/56
Aluminum pig	25.00	24.00	8/10/56
Copper (E)	36.00	40.00	10/26/56
Copper (CS)	36.00	35.00	10/31/56
Copper (L)	36.00	40.00	10/27/56
Lead, E. St. L.	15.80	16.30	1/13/56
Lead, N. Y.	16.00	16.50	1/13/56
Magnesium ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	64.50	60.00	11/24/54
Titanium sponge	270-300	295-325	7/7/56
Zinc, E. St. L.	13.50	13.00	1/6/56
Zinc, N. Y.	14.00	13.50	1/6/56

ALUMINUM: 99% ingot frt allwd. **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic, (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig. Velasco, Tex. **NICKEL:** Port Colbourne, Canada. **ZINC:** prime western. **TIN:** see column at right, other primary prices, pg. 198.

Special Reports

On Finishing Non-Ferrous Metals

NUMBER II—Paint Base, Corrosion-Resistant Finishing with Iridite

WHAT IS IRIDITE?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

Chromate conversion coatings are well known and accepted throughout industry as an economical means of providing corrosion protection, a good paint base and decorative finishes for non-ferrous metals. However, continued developments have been so rapid and widespread that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this digest of current information; to bring you up to date on the many ways in which you can obtain proper surface preparation for painting and increase product durability with a single multi-purpose chemical pretreatment. Report I on decorative, corrosion-resistant finishes and Report III on chemically polished, corrosion-resistant finishes are available on request.

First, it is an accepted fact that metal surfaces should be prepared before painting to make possible an efficient paint system. Naturally, this preparation should provide for good initial paint adhesion. Chemical treatments have proved extremely effective in this respect, particularly those of a neutral or preferably acid nature. Further, to be most efficient, chemical treatments should provide a non-porous barrier to maintain adhesion by sealing the metal from the paint and moisture. They should also provide a self-healing film which prevents lateral corrosion in the event that bare metal is exposed through scratching.

The Iridite chromate conversion coatings meet all these requirements. Iridite

is a chemical conversion treatment for surface preparation. It provides initial paint bonding by molecular adhesion. It is acid in nature and produces a film that is gel-like and non-porous in structure. Thus, the Iridite film effectively seals the metal from the paint and from moisture penetration. Because the film contains certain relatively soluble constituents, it will protect areas scratched through to bare metal and prevent lateral corrosion. This is accomplished by a gradual leaching of these constituents into the damaged area.

Further, because of its gel-like, non-crystalline nature, the Iridite film will not affect the appearance or texture of the paint film, nor will it dust or powder to mar the painted surface. Because the film is non-porous, paint coverage is increased, thus substantial savings in paint costs will be realized. In addition, treated parts may be stored for long periods of time prior to painting without the risk of entrapped moisture causing blistering when painting.

Iridite chromate conversion coatings are widely used with equal ease and success under both baked and air-dried paint systems. While the actual adherence properties of the Iridite film do not increase appreciably with its thickness, corrosion protection does. The protection of the Iridite film is proportionate to its thickness and should be taken into consideration when selecting the Iridite to meet your needs. However, it is sometimes necessary to sacrifice maximum corrosion protection for appearance when a finished

part is to be only partially painted. For example, it may be desirable to use a thin, clear, bright Iridite film if the unpainted areas must present a chrome-like appearance. A typical case is that of instrument housings on which the exterior is painted and the inside left unpainted.

On the other hand, if all surfaces of the product are to be painted and maximum corrosion protection is required, the heavier and most protective Iridite films should be used. For example, all surfaces of zinc die cast fruit juicers are finished with a highly protective Iridite film prior to painting to provide maximum resistance to the corrosive action of fruit juices.

Iridite finishes are now available for all commercial forms of the more commonly used non-ferrous metals, including zinc, cadmium, aluminum, magnesium, silver, copper, brass and bronze. In addition to providing an excellent base for paint, the Iridite films also have high decorative value when used as final finishes in themselves.

These films can produce a wide variety of pleasing appearances including clear bright, iridescent yellow, bronze, olive drab and brown. In addition, many films can be modified by bleaching or by dyeing. Among the dye colors available are various shades of red, yellow, green, blue or black.

In planning or designing, you should consider the many other characteristics of Iridite finishes which may enter into the specific problem. In addition to their functions as protective and decorative finishes, and as bases for organic finishes and bonding compounds, Iridites have low electrical resistance. Some can be soldered and welded. The film does not affect the dimensional stability of close tolerance parts.

Iridites are widely approved under both Armed Services and industrial specifications because of performance, low cost and savings of materials and equipment.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product requires the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 East Monument Street, Baltimore 5, Maryland.

Nonferrous Prices (Effective Nov. 13, 1956)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136- .249	.250- 3.
1800, 1100, 3003.....	44.3	42.1	40.9	40.2
6052.....	51.8	46.8	45.1	42.9
6061-0.....	48.9	44.6	42.8	42.6

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8.....	45.5-47.3	61.3-65.1
12-14.....	46.2-47.7	62.2-66.8
24-26.....	49.4-49.5	73.1-77.8
36-38.....	58.3-59.0	97.4-101.0

Screw Machine Stock—2011-T-3

Size"	3/4	5/8-9/8	1/2-1	1 1/4-1 3/4
Price	59.7	58.8	57.4	55.2

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
#19 gage.....	\$1.352	\$1.803	\$2.254	\$2.704
#24 gage.....	1.686	2.252	2.815	3.378

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type→	Gage→	.250- 3.00	.250- 2.00	.188	.081	.032
AZ31B Stand, Grade.....		67.9	69.0	77.9	103.1	
AZ31B Spec.....		93.3	95.7	108.7	171.3	
Tread Plate.....		70.6	71.7			
Tooling Plate.....		73.0				

Extruded Shapes

Factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C).....	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B).....	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting).....	37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting).....	40.75 (Volcano, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR.....	113	97	118
Strip, CR.....	111	99	122
Rod, bar, HR.....	94	80	99
Angles, HR.....	94	80	99
Plates, HR.....	107	96	111
Seamless tube.....	144	120	190
Shot, blocks.....		78	

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper.....	57.63	.....	54.86	57.82
Brass, 70/30.....	49.44	49.98	49.37	53.35
Brass, Low.....	52.65	53.19	52.59	55.46
Brass, R L.....	53.79	54.33	53.73	56.90
Brass, Naval.....	53.39	.....	47.70	56.55
Muntz Metal.....	51.44	.....	47.25	.....
Comm. Brs.....	55.48	56.02	55.42	58.04
Mang. Brs.....	57.13	.....	51.23	.....
Phos. Brs. 5%.....	76.25	.....	76.75	.....

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, \$12.10-\$12.50; alloy, \$15.00-\$15.75; Plate, HR, commercially pure, \$10.00-\$10.50; alloy, \$11.50-\$12.00. Wire, rolled and/or drawn, commercially pure, 9.00-\$11.50; alloy, \$11.50; Bar, HR or forged, commercially pure, \$7.55-\$7.80; alloy, \$7.55-\$7.75.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex... \$3.50
Beryllium aluminum 5% Be, Dollar per lb contained Be... \$74.75
Beryllium copper, per lb contained Be... \$43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading... \$71.50
Bismuth, ton lots... \$2.25
Cadmium, del'd... \$1.70
Calcium, small lots... \$4.55
Chromium, 99.8% metallic basis... \$1.31
Cobalt, 97-99% (per lb)... \$2.60 to \$2.67
Germanium, per gm, f.o.b. Miami, Okla., refined... \$48.50
Gold, U. S. Treas., per troy oz... \$35.00
Indium, 99.9% dollars per troy oz... \$2.25
Iridium, dollars per troy oz... \$90 to \$100
Lithium, 98%... \$11.00 to \$14.00
Magnesium, sticks, 100 to 500 lb... \$9.00
Mercury, dollars per 76-lb flask, f.o.b. New York... \$253 to \$255
Nickel oxide sinter at Copper Cliff, Ont., contained nickel... 60.75
Palladium, dollars per troy oz... \$23 to \$24
Platinum, dollars per troy oz... \$103 to \$105
Rhodium... \$120.00 to \$125.00
Silver ingots (\$ per troy oz)... 91.375
Thorium, per kg... \$45.00
Uranium, normal per kg... \$40.00
U-235, per lb (nominal)... \$11,000
Vanadium... \$3.45
Zirconium sponge... \$10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115... 35.00
No. 120... 33.75
No. 123... 32.25
80-10-10 ingot
No. 305... 38.50
No. 315... 36.75
88-10-2 ingot
No. 210... 48.75
No. 215... 44.50
No. 245... 40.00
Yellow ingot
No. 405... 27.50
Manganese bronze
No. 421... 30.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max... 26.25-27.25
0.60 copper max... 26.00-26.50
Piston alloys (No. 122 type)... 26.00-26.50
No. 12 alum. (No. 2 grade)... 23.50-24.75
108 alloy... 24.00-25.00
195 alloy... 26.50-27.00
13 alloy (0.60 copper max)... 26.00-26.50
AXS-679... 24.00-25.00

Steel deoxidizing aluminum, notch bar

granulated or shot
Grade 1—86-97 1/2%... 24.00-25.00
Grade 2—82-95%... 23.25-24.00
Grade 3—90-93%... 22.50-23.50
Grade 4—85-90%... 21.75-22.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper.....	32	31 1/4
Yellow brass.....	24 1/2	22 1/2
Red brass.....	23 1/2	27 1/2
Comm. bronze.....	29 1/2	28 1/2
Mang. bronze.....	23 1/2	23 1/2
Yellow brass rod ends.....	24 1/2	....

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire... 30 1/2
No. 2 copper wire... 29
Light copper... 26 1/2
*Refinery brass... 27 1/2
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire... 30 1/2
No. 2 copper wire... 29
Light copper... 26 1/2
No. 1 composition... 23 1/2
No. 1 comp. turnings... 26 1/2
Hvy. yellow brass solids... 19 1/2
Brass pipe... 19 1/2
Radiators... 21 1/2

Aluminum

Mixed old cast... 16 —16 1/2
Mixed new clips... 17 —17 1/2
Mixed turnings, dry... 16 —17

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire... 27 1/2-28
No. 2 copper wire... 26 —26 1/2
Light copper... 23 1/2-24
Auto radiators (unswaged)... 17 1/2-18
No. 1 composition... 23 1/2-24
No. 1 composition turnings... 22 —22 1/2
Cocks and faucets... 18 —18 1/2
Clean heavy yellow brass... 15 —15 1/2
Brass pipe... 19 —19 1/2
New soft brass clippings... 20 1/2-21
No. 1 brass rod turnings... 18 —18 1/2

Aluminum

Alum. pistons and struts... 6 1/2-7
Aluminum crankcases... 11 1/2-12
1100 (2S) aluminum clippings... 14 1/2-15
Old sheet and utensils... 11 1/2-12
Borings and turnings... 8 —8 1/2
Industrial castings... 11 1/2-12
2024 (24S) clippings... 13 —13 1/2

Zinc

New zinc clippings... 7 —7 1/2
Old zinc... 4 1/2-5
Zinc routings... 2 1/2-3
Old die cast scrap... 2 1/2-2 3/4

Nickel and Monel

Pure nickel clippings... \$1.85-\$1.95
Clean nickel turnings... \$1.55-\$1.65
Nickel anodes... \$1.85-\$1.95
Nickel rod ends... \$1.85-\$1.95
New Monel clippings... 80-90
Clean Monel turnings... 70-80
Old sheet Monel... 70-80
Nickel silver clippings, mixed... 21
Nickel silver turnings, mixed... 18

Lead

Soft scrap lead... 12 1/2-13
Battery plates (dry)... 7 —7 1/2
Batteries, acid free... 4 1/2

Miscellaneous

Block tin... 80 —81
No. 1 pewter... 62 1/2-63
Auto babbitt... 42 —42 1/2
Mixed common babbitt... 13 —13 1/2
Solder joints... 18 —18 1/2
Siphon tops... 42
Small foundry type... 15 1/2-15 3/4
Monotype... 14 1/2-15
Lino. and stereotype... 13 —13 1/2
Electrotype... 12 1/2-13
Hand picked type shells... 10 —10 1/2
Lino. and stereo. dross... 5 1/2-5 3/4
Electro. dross... 4 1/2-4 3/4

**STEEL
PRICES**(Effective
Nov. 15, 1956)

	BILLETS, BLOOMS, SLABS			PIL- ING	SHAPES STRUCTURALS			STRIP					
	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled
EAST	Bethlehem, Pa.		\$107.00 B3		5.95 B3	7.40 B3	5.95 B3						
	Buffalo, N. Y.	\$74.00 B3, R3	\$91.50 B3, R3	\$107.00 B3, R3	5.90 B3	5.05 B3	7.40 B3	5.05 B3	4.875 B3, R3	6.85 R7	6.95 B3		
	Claymont, Del.												
	Harrison, N. J.												14.55 C11
	Conschocken, Pa.		\$96.50 A2	\$114.00 A2				4.725 A2	6.90 A2	6.95 A2			
	New Bedford, Mass.								7.30 R6				
	Johnstown, Pa.	\$74.00 B3	\$91.50 B3	\$107.00 B3		5.95 B3	7.40 B3						
	Boston, Mass.								7.40 T8				14.90 T8
	New Haven, Conn.								7.30 D1				
	Baltimore, Md.								6.85 T8				
	Phoenixville, Pa.				5.85 P2		5.85 P2						
	Sparrows Pt., Md.							4.675 B3		6.95 B3			
	Bridgeport, Wallingford, Conn.	\$79.00 N8	\$96.50 N8	\$107.00 N8					7.30 W1 6.95 T8				
	Pawtucket, R. I. Worcester, Mass.								7.40 A5,N7				14.90 N7
MIDDLE WEST	Alton, Ill.							4.875 L1					
	Ashland, Ky.							4.675 A7					
	Canton-Massillon, Dover, Ohio		\$94.00 R3	\$107.00 R3, T5					6.85 G4		10.10 G4		14.55 G4
	Chicago, Ill. Franklin Park, Ill.	\$74.00 U1, R3	\$91.50 U1, R3,W8	\$107.00 U1, R3,W8	5.90 U1	5.00 U1, W8	7.35 U1, Y1 6.00 W8	5.00 U1	4.875 N4 4.675 A1	6.95 A1, T8		7.75 W8 S9	14.55 A1, S9, T8
	Cleveland, Ohio								6.85 A5, J3			7.75 J3	
	Detroit, Mich.	\$74.00 R5		\$107.00 R5				4.775 G3, M2	6.95 M2, G3, D2, P11	7.05 G3	10.10 G3, S1, D2	7.05 G3	
	Anderson, Ind.								6.85 G4		10.10 G4		
	Duluth, Minn.												
	Gary, Ind. Harbor, Indiana	\$74.00 U1	\$91.50 U1	\$107.00 U1, Y1	5.90 J3	5.00 U1	7.35 U1, J3	5.00 J3	4.675 U1, J3, Y1	5.85 Y1	6.95 U1, J3, Y1	10.20 Y1	7.75 U1, Y1
	Sterling, Ill.	\$74.00 N4						4.775 N4					
	Indianapolis, Ind.								7.90 C5				
	Newport, Ky.											7.75 N5	
	Middletown, Ohio												
WEST	Niles, Warren, Ohio Sharon, Pa.		\$91.50 S1, C10	\$107.00 S1, C10				4.675 S1, R3	6.85 T4	6.95 S1, R3	10.00 S1, R3	7.75 S1	14.55 S1
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	\$74.00 U1, J3	\$91.50 U1, J3, C11	\$107.00 U1, C11	5.90 U1	5.00 U1, J3	7.35 U1, J3	5.00 U1	4.675 P6	5.750 P6 6.85 J3, B4, S7		7.75 S9	14.55 S9
	Portsmouth, Ohio												
	Weirton, Wheeling, Follansbee, W. Va.					5.90 W3		4.675 W3	6.85 W3, F3	6.95 W3	9.65 W3		
	Youngstown, Ohio	\$74.00 R3	\$91.50 Y1, C10	\$107.00 Y1		5.90 Y1	7.35 Y1	4.675 U1, Y1	6.85 Y1, C5	6.95 U1, Y1	10.20 Y1	7.75 U1, Y1	
	Fontana, Cal.	\$83.50 K1	\$101.00 K1	\$128.00 K1		5.70 K1	8.05 K1	5.85 K1	5.475 K1	8.50 K1			
	Geneva, Utah	\$91.50 C7				5.00 C7	7.35 C7						
	Kansas City, Mo.					5.10 S2	7.45 S2		4.925 S2		7.20 S2		
	Los Angeles, Torrance, Cal.		\$101.00 B2	\$127.00 B2		5.70 C7, B2	8.05 B2		5.425 B2, C7	8.90 C1		8.95 B2	
	Minneapolis, Colo.					5.30 C6			5.775 C6				
	Portland, Ore.					5.75 O2							
	San Francisco, Niles, Pittsburg, Cal.		\$101.00 B2			5.85 B2	8.00 B2		5.425 C7, B2				
	Seattle, Wash.		\$105.00 B2			5.75 B2	8.10 B2		5.675 B2				
SOUTH	Atlanta, Ga.								4.675 A8				
	Fairfield, Ala. City, Birmingham, Ala.	\$74.00 T2	\$91.50 T2			5.90 T2, R3 5.30 C16	7.35 T2		4.675 T2, R3 4.975 C16	6.95 T2			
	Houston, Lone Star, Texas	\$80.00 L3	\$96.50 S2	\$112.00 S2		5.10 S2	7.45 S2		4.925 S2		7.20 S2		

STEEL PRICES(Effective
Nov. 13, 1956)

		SHEETS								WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & byr.	Cold- rolled	Galvanized	Enamel- ing	Long Tern	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot- rolled 19 ga.	Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Bethlehem, Pa.												
	Buffalo, N. Y.	4.675 B3	5.75 B3				6.90 B3	8.525 B3		5.80 W6	† Special coated mfg. terms deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct .220 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add \$1.00. Differ- ential 1.00 lb./0.25 lb. add 65¢.		
	Claymond, Del.												
	Coatesville, Pa.												
	Consheocken, Pa.	4.725 A2	5.80 A2				6.95 A2						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									5.80 B3			
	Fairless, Pa.	4.725 U1	5.80 U1				6.95 U1	8.575 U1			\$9.00 U1	\$8.50 U1	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	4.675 B3	5.75 B3	6.30 B3			6.90 B3	8.575 B3	9.275 B3	5.90 B3	\$9.80 B3		
	Worcester, Mass.									6.10 A5			
MIDDLE WEST	Trenton, N. J.												
	Alton, Ill.									6.00 L1			
	Ashland, Ky.	4.675 A7		6.30 A7	6.325 A7								
	Canton-Massillon, Dover, Ohio			6.30 R3, R1									
	Chicago, Joliet, Ill.	4.675 W8, A1					6.90 U1			5.80 K2	5.80 A5, R3, N4, W8, K2		
	Sterling, Ill.										5.90 N4, K2		
	Cleveland, Ohio	4.675 J3, R3	5.75 J3, R3		6.325 R3		6.90 R3	8.525 R3, J3		5.80 A5			
	Detroit, Mich.	4.775 G3, M2	5.85 G3, 5.75 M2				7.00 G2	8.625 G3					
	Newport, Ky.	4.675 A9	5.75 A9										
	Gary, Ind. Harbor, Indiana	4.675 U1, I3, Y1	5.75 U1, I3, Y1	6.30 U1, I3	6.325 U1, I3, Y1	6.70 U1	6.90 U1, Y1, I3	8.525 U1, Y1		5.80 Y1	\$9.70 U1, Y1	\$8.40 I3, U1, Y1	7.15 U1, Y1
	Granite City, Ill.	4.875 G2	5.95 G2	6.50 G2	6.525 G2							\$8.50 G2	7.25 G2
	Kokomo, Ind.			6.40 C9						5.90 C9			
	Mansfield, Ohio		5.75 E2			6.70 E2							
	Middletown, Ohio		5.75 A7	6.30 A7	6.325 A7	6.70 A7							
	Niles, Warren, Ohio Sharon, Pa.	4.675 S1, R3, N3	5.75 R3	6.30 R3	6.325 N3	6.70 N3	6.90 S1, R3	8.525 S1, R3				\$8.30 R3	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 U1, J3, P6	5.75 U1, J3, P6	6.30 U1, J3	6.325 U1		6.90 U1, J3, R3	8.525 U1, J3	9.275 U1	5.80 A5, P6, J3	\$9.70 J3, U1	\$8.40 U1	7.15 U1
	Portsmouth, Ohio	4.675 P7	5.75 P7							5.80 P7			
	Weirton, Wheeling, Follansbee, W. Va.	4.675 W3, W5	5.75 W3, W5, F3	6.30 W3, W5		6.70 W3, W5	6.90 W3	8.525 W3			\$9.60 W5	\$8.30 W5	7.15 W5 7.40 W3
	Youngstown, Ohio	4.675 U1, Y1	5.75 Y1		6.325 Y1		6.90 Y1	8.525 Y1		5.80 Y1			7.15 Y1
WEST	Fontana, Cal.	5.475 K1	6.95 K1				7.70 K1	9.725 K1			\$10.35 K1	\$9.05 K1	
	Geneva, Utah	4.775 C7											
	Kansas City, Mo.									6.05 S2			
	Los Angeles, Torrance, Cal.									6.60 B2			
	Minnequa, Colo.									6.05 C6			
	San Francisco, Niles, Pittsburg, Cal.	5.375 C7	6.70 C7	7.05 C7						6.45 C7	\$10.45 C7	\$9.15 C7	
	Seattle, Wash.												
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	4.675 T2, R3	5.75 T2,	6.30 T2, R3						5.80 T2, R3	\$9.80 T2	\$8.50 T2	
	Houston, Tex.									6.05 S2			

IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL PRICES(Effective
Nov. 13, 1956)

EAST

MIDDLE WEST

WEST

SOUTH

BARS**PLATES****WIRE**

	Carbon † Steel	Reinforc- ing	Cold Finished	Alloy Hot- rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Flame Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
Bethlehem				6.125 B3	8.325 B3	7.40 B3					
Buffalo, N. Y.	5.075 B3,R3	5.075 B3,R3	6.90 B5	6.125 B3,R3	8.325 B5,B3	7.40 B3	4.85 B3				7.20 W6
Claymont, Del.							5.35 C4		6.85 C4	7.55 C4	
Coatesville, Pa.							5.25 L4		6.85 L4	7.55 L4	
Conshohocken, Pa.							4.90 A2	5.925 A2	6.25 A2	7.25 A2	
Harrisburg, Pa.							5.80 P2	6.275 C3			
Hartford, Conn.			7.35 R3		8.625 R3	7.40 B3					
Johnstown, Pa.	5.075 B3	5.075 B3		6.125 B3			4.85 B3		6.85 B3	7.25 B3	7.20 B3
Fairless, Pa.	5.225 U1	5.225 U1		6.275 U1							
Newark, N. J.			7.30 W10		8.50 W10						
Camden, N. J.			7.30 P10		8.50 P10						
Bridgeport, Conn.	5.38 N8	5.38 N8	7.20 N8	6.20 N8	8.475 N8	7.50 N8					
Putnam, Conn.			7.40 W10								
Sparrows Pt., Md.		5.075 B3					4.85 B3		6.85 B3	6.85 B3	7.30 B3
Palmer, Worcester, Readville, Mass. Milton, Pa.	5.225 M7	5.225 M7	7.40 B5,C14		8.325 A5 8.625 B5						7.50 A5,W6 9.025 T8
Spring City, Pa.			7.30 K4		8.50 K4						
Alton, Ill.	5.275 L1										7.40 L1
Ashland, Newport, Ky.							4.85 A7,N5		6.85 N5		
Canton, Massillon, Ohio			6.85 R3,R2	6.125 R3,T5	8.325 R3,R2, T5						
Chicago, Joliet, Ill.	5.075 U1,R3, W8,N4 5.575 P13	5.075 U1,R3, N4 5.575 P13	6.85 A5,B5, W10,L2 W8,L2,N9	6.125 U1,R3, W8	8.325 A5,B5, W8,L2,N9, W10	5.875 W8	4.85 U1,J3, W8,A1	5.925 U1	6.85 U1,W8	7.25 U1	7.20 A5,K2, R3,N4,W7
Cleveland, Ohio	5.075 R3	5.075 R3	6.85 A5,C13		8.325 A5,C13	7.425 R3	4.95 J3,R3	5.925 J3		7.25 J3,R3	7.20 A5, C13
Detroit, Mich.	5.175 G3	5.425 G3	7.05 B5,P8 7.10 P3 6.85 R5	6.225 G3	8.525 B5,P3, P8 8.325 R5	7.525 G3	4.95 G3		6.90 G3		
Duluth, Minn.				6.125 R5							7.20 A5
Gary, Ind. Harbor, Crawfordsville	5.075 U1,J3, Y1	5.075 U1,J3, Y1	6.85 R3,M5	6.125 U1,J3, Y1	8.325 R3,M4	7.425 U1,J3, Y1	4.85 U1,J3, Y1	5.925 J3	6.85 U1,Y1	7.25 U1,Y1	7.30 M4
Granite City, Ill.							5.05 G2				
Kokomo, Ind.											7.30 C9
Sterling, Ill.	5.525 N4	5.175 N4									7.30 K2
Niles, Warren, Ohio Sharon, Pa.			6.85 C10	6.125 C10,S1	8.325 C10	7.425 S1	4.85 S1,R3		6.85 S1	7.25 S1,R3	
Pittsburgh, Pa. Midland, Pa.	5.075 U1, C11,J3	5.075 U1,J3	6.85 A5,C8, J3,R3,S9, B4,W10	6.125 U1,C11	8.325 A5,R3, S9,C8,W10, C11	7.425 U1,J3	4.85 U1,J3	5.925 U1	6.85 U1,J3	7.25 U1,J3	7.20 A5,J3, P6
Portsmouth, Ohio											7.20 P7
Weirton, Wheeling, Follansbee, W. Va.							4.85 W5				
Youngstown, Ohio	5.075 U1, Y1,R3	5.075 U1, Y1,R3	6.85 U1,Y1, F2	6.125 U1,Y1	8.325 Y1,F2	7.425 U1,Y1	4.85 U1,Y1, R3		6.85 Y1	7.25 Y1	7.20 Y1
Emeryville, Cal.	5.825 J5	5.825 J5									
Fontana, Cal.	5.775 K1	5.775 K1		7.175 K1		8.125 K1	5.55 K1		7.55 K1	7.95 K1	
Geneva, Utah	5.175 C7						4.85 C7			7.25 C7	
Kansas City, Mo.	5.325 S2	5.325 S2		6.375 S2		7.675 S2					7.45 S2
Los Angeles, Torrance, Cal.	5.775 C7,B2	5.775 C7,B2	8.30 R3	7.175 B2		8.125 B2					8.15 B2
Minneapolis, Colo.	5.525 C6	5.525 C6					5.70 C6				7.45 C6
Portland, Ore.	5.825 O2	5.825 O2									
San Francisco, Niles, Pittsburgh, Cal.	5.775 C7,P9 5.825 B2	5.775 C7,P9 5.825 B2				8.175 B2					8.15 C7,C6
Seattle, Wash.	5.825 B2 5.825 N6	5.825 B2				8.175 B2	5.75 B2		7.75 B2	8.15 B2	
Atlanta, Ga.	5.575 A8										7.40 A8
Fairfield, Ala. City, Birmingham, Ala.	5.075 T2,R3 5.375 C16	5.075 T2,R3 5.375 C16				7.425 T2	4.85 T2,R3			7.25 T2	7.20 T2,R3
Houston, Ft. Worth, Lone Star, Tex.	5.325 S2	5.325 S2		6.375 S2		7.675 S2	4.95 S2 5.20 L3		6.95 S2	7.35 S2	7.45 S2

† Merchant Quality—Specialty Quality .35¢ higher.

November 15, 1956

Steel Prices (Effective Nov. 13, 1956)

Key to Steel Producers

With Principal Offices

- A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shifting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperwell Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shifting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.
D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Diaston Div., Philadelphia
E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.
F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown

- F3 Follansbee Steel Corp., Follansbee, W. Va.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
H1 Hanna Furnace Corp., Detroit
I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland
J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.
K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.
L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.
O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland
P1 Page Steel & Wire Div., Moonstown, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit

- P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebing Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.
S1 Dearborn Div., Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston
U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham
W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pt) L.S.B. mills. Base price about \$200 per net ton.

	BUTTWELD												SEAMLESS							
	1/2 In.		3/4 In.		1 In.		1 1/4 In.		1 1/2 In.		2 In.		2 1/2 In.		3 In.		3 1/2-4 In.			
	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.
STANDARD T. & C.																				
Sparrows Pt. B3.....	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	.....	.....	.....	.....	.....	.....
Youngstown R3.....	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....
Fontana K1.....	0.00	-15.25	3.00	+11.25	5.50	+7.75	8.00	+7.00	8.50	+6.00	9.00	+5.50	10.50	+5.75	.....	.....	.....	.....	.....	.....
Pittsburgh J3.....	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75
Alton, Ill. L1.....	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	.....	.....	.....	.....	.....	.....
Sharon M3.....	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....
Fairless N2.....	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	.....	.....	.....	.....	.....	.....
Pittsburgh N1.....	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75
Wheeling W5.....	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....
Wheatland W4.....	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....
Youngstown Y1.....	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75
Indiana Harbor Y1.....	11.50	+5.75	14.50	1.25	17.00	3.75	19.50	4.50	20.00	5.50	20.50	6.00	22.00	5.75	.....	.....	.....	.....	.....	.....
Lerain N2.....	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75
EXTRA STRONG																				
PLAIN ENDS																				
Sparrows Pt. B3.....	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	.....	.....	.....	.....	.....	.....
Youngstown R3.....	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....
Fairless N2.....	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	.....	.....	.....	.....	.....	.....
Fontana K1.....	4.50	.....	6.50	.....	10.50	.....	11.00	.....	11.50	.....	12.00	.....	12.50	.....	.....	.....	.....	.....	.....	.....
Pittsburgh J3.....	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25
Alton, Ill. L1.....	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	.....	.....	.....	.....	.....	.....
Sharon M3.....	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....
Pittsburgh N1.....	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25
Wheeling W5.....	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....
Wheatland W4.....	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....
Youngstown Y1.....	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25
Indiana Harbor Y1.....	16.00	3.25	20.00	6.25	22.00	9.75	22.50	8.50	23.00	9.50	23.50	10.00	22.00	8.75	.....	.....	.....	.....	.....	.....
Lerain N2.....	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25

Threads only, butt weld and seamless 2 1/2 pt. higher discount. Plain ends, butt weld and seamless, 3-in. and under, 5 1/4 pt. higher discount. Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1/2, 3/4 and 1-in., 2 pt.; 1 1/4, 1 1/2 and 2-in., 1 1/2 pt.; 2 1/2 and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2 1/2" and 3" pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	\$1.68	T-1
18	4	1	—	6	2.385	T-4
18	4	2	—	—	1.845	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	2	8	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium... .83 D-3, D-5
Oil hardened manganese... .45 O-2
Special carbon... .41 W-1
Extra carbon... .345 W-1
Regular carbon... .29 W-1
Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

Cladding	Plate (A3, J2, L4)			Sheet (J2)	
	10 pct	15 pct	20 pct	20 pct	
302					33.25
304	34.60	38.00	41.50		35.25
316	39.70	43.20	46.65		52.25
321	34.35	39.90	43.50		42.00
347	39.50	43.95	48.45		51.00
405	29.20	33.15	37.05		
410, 430	28.70	32.65	36.55		

CR Strip (89) Copper, 10 pct, 2 sides, 41.40; 1 side, 33.60.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
		Semi-Processed	Fully Processed
Field.....	9.00	9.28	.....
Armature.....	10.35	10.35	10.85
Elect.....	11.00	11.025	11.525
Meter.....	12.05	12.075	12.575
Dynamo.....	13.05	13.05	13.55
Trans. 72.....	14.05	14.05	14.55
Trans. 65.....	14.60		
Trans. 58.....	15.10		
Trans. 52.....	16.15		

Producing points: Beech Bottom (W5); Brackenridge (A3); Granite City (G2); Indiana Harbor (I3); Niansfield (E2); Newport, Ky. (N5); Niles, O. (N5); Vandergrift (U); Warren, O. (R5) (10¢ higher, HR); Zanesville, Butler (A7).

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump.....	\$12.10
Old range, bessemer.....	11.25
Old range, nonbessemer.....	11.10
Mesabi, bessemer.....	11.00
Mesabi, nonbessemer.....	10.85
High phosphorus.....	10.85

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

City	City Delivery & Charge	Sheets		Strip		Plates		Shapes		Bars		Alloy Bars			
		Hot-Rolled 10 ga. & lvr.	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled	Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled 4140	Hot-Rolled 4815	Cold-Drawn 4140	Cold-Drawn 4815	Cold-Drawn 4140	Cold-Drawn 4815
Atlanta.....		8.07	9.27	9.83	8.16	.....	8.40	8.44	8.30	10.14	.....	.....	.....	.....	.....
Baltimore.....	\$.10	7.79	8.99	9.12	8.27	.....	8.12	8.57	8.34	9.09	14.99	14.44	18.39	18.09	.....
Birmingham.....	.15	7.68	8.88	8.85	7.78	.....	8.01	8.05	7.91	10.04	.....	.....	.....	.....	.....
Boston.....	.10	8.70	9.73	11.02	8.70	.....	8.98	8.90	8.88	10.71	15.95	14.45	18.51	18.10	.....
Buffalo.....	.15	8.50	9.83	8.89	8.89	.....	9.05	9.00	8.95	10.81	.....	.....	.....	.....	.....
Chicago.....	.15	7.90	9.05	10.67	8.15	.....	8.40	8.40	8.15	8.85	15.80	14.45	18.40	.....	.....
.....		7.78	8.90	9.70	7.78	.....	8.01	8.05	7.91	8.35	14.45	14.10	18.05	17.75	.....
.....		7.85	9.05	7.93	7.93	.....	8.16	8.20	8.06	8.50	.....	.....	.....	.....	.....
Cincinnati.....	.15	7.97	9.04	9.90	8.21	.....	8.49	8.70	8.34	8.97	14.93	14.38	18.33	18.03	.....
Cleveland.....	.15	7.68	8.88	9.60	7.68	.....	8.21	8.38	7.99	8.60	14.73	14.18	18.13	17.83	.....
Denver.....		9.55	11.09	12.41	9.70	.....	9.20	9.60	9.75	10.54	.....	.....	.....	.....	.....
Detroit.....	.15	8.06	9.28	10.17	8.25	.....	8.48	8.70	8.33	8.83	.....	14.04	.....	17.09	.....
Houston.....		8.70	9.65	.....	8.80	.....	8.60	8.90	8.45	10.55	15.50	.....	19.30	19.05	.....
Kansas City.....	.20	8.52	9.72	10.07	8.60	.....	8.83	8.87	8.73	9.42	15.32	14.77	18.72	18.42	.....
Los Angeles.....	.10	8.90	10.65	11.65	9.10	.....	9.35	8.95	8.80	11.70	15.85	15.35	19.70	19.45	.....
Memphis.....	.15	8.02	9.22	.....	8.12	.....	8.35	8.30	8.25	9.85	.....	.....	.....	.....	.....
Milwaukee.....	.15	7.82	9.02	9.82	7.90	.....	8.13	8.24	8.03	8.57	14.77	.....	18.17	17.67	.....
New York.....	.10	8.45	9.63	10.33	8.91	.....	8.88	8.84	8.93	10.71	15.02	14.47	18.42	18.12	.....
Norfolk.....	.20	8.00	.....	.....	8.40	.....	8.35	8.70	8.45	10.70	.....	.....	.....	.....	.....
Philadelphia.....	.10	7.89	9.09	9.66	8.58	.....	8.28	8.38	8.37	9.12	14.80	14.15	18.20	17.90	.....
.....		7.99	9.18	10.22	8.68	.....	8.38	8.48	8.47	9.22	.....	14.25	.....	.....	.....
Pittsburgh.....	.15	7.68	8.88	10.05	7.88	.....	8.01	8.20	7.91	8.60	14.65	13.80	18.05	16.85	.....
Portland.....		8.90	9.65	11.40	9.05	.....	8.70	8.90	8.95	13.55	16.70	16.10	20.40	20.25	.....
San Francisco.....	.10	8.75	10.30	10.80	8.95	.....	8.85	8.85	8.80	12.30	15.85	15.35	19.70	19.45	.....
Seattle.....		9.35	10.45	11.55	9.50	.....	9.05	9.15	9.30	13.15	16.10	15.55	19.50	19.20	.....
St. Louis.....	.15	8.62	9.21	10.03	8.11	.....	8.34	8.48	8.25	8.93	14.83	14.28	18.23	17.93	.....
.....		8.17	9.49	10.18	8.26	.....	8.49	8.63	8.40	9.08	14.98	14.38	.....	.....	.....
St. Paul.....	.15	8.29	9.64	10.31	8.39	.....	8.71	8.75	8.52	9.21	.....	14.62	.....	18.27	.....

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
** F.O.B. Plant, warehouse price. † 16 gage. ‡ Deduct for country delivery.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails		Woven Wire Fence		Fence Posts		Single Loop Bale Ties		Galv. Barbed and Twisted Barbless Wire		Merch. Wire Ann'd	
	Col	Col	Col	Col	Col	Col	Col	Col	Col	Col	Col	Col
Alabama City R3.....	167	181	.....	195	187	8.10	8.50	.....	.....	.....	.....	.....
Aliquippa, Pa. J3***	164	179	.....	181	171	7.95	8.475	.....	.....	.....	.....	.....
Atlanta A8**	166	182	.....	192	190	8.05	8.65	.....	.....	.....	.....	.....
Bartonsville K2**	166	182	.....	192	190	8.05	8.65	.....	.....	.....	.....	.....
Buffalo W6	164	180	167	190	188	7.95	8.55	.....	.....	.....	.....	.....
Chicago, Ill. N4**	173	188	.....	198	187	8.10	.....	.....	.....	.....	.....	.....
Cleveland A6	166	182	.....	192	190	8.05	8.65	.....	.....	.....	.....	.....
Cleveland A5	164	176	.....	190	184	7.95	8.35	.....	.....	.....	.....	.....
Crawfordville M4**	164	176	.....	190	184	7.95	8.35	.....	.....	.....	.....	.....
Donora, Pa. A5	164	176	.....	190	184	7.95	8.35	.....	.....	.....	.....	.....
Duluth A5	164	176	.....	190	184	7.95	8.35	.....	.....	.....	.....	.....
Fairfield, Ala. T2	164	176	.....	190	184	7.95	8.35	.....	.....	.....	.....	.....
Galveston D4	160	181	.....	195	189	8.20	8.60	.....	.....	.....	.....	.....
Houston S2	164	180	167	190	188	7.95	8.55	.....	.....	.....	.....	.....
Johnstown, Pa. B3**	164	176	.....	190	184	7.95	8.35	.....	.....	.....	.....	.....
Joliet, Ill. A5	166	178	.....	192	186	8.05	8.45	.....	.....	.....	.....	.....
Kokomo, Ind. C9*	169	181	.....	195	189	8.20	8.60	.....	.....	.....	.....	.....
Los Angeles B2**	169	181	172	195	189	8.20	8.60	.....	.....	.....	.....	.....
Kansas City S2*	169	181	.....	195	189	8.20	8.60	.....	.....	.....	.....	.....
Minneapolis C6*	169	181	.....	195	189	8.20	8.60	.....	.....	.....	.....	.....
Moneasen P6	167	185	.....	191	181	8.10	8.50	.....	.....	.....	.....	.....
Pittsburgh, Cal. C7	166	178	.....	192	186	8.05	8.45	.....	.....	.....	.....	.....
Portsmouth P7	164	176	.....	190	184	7.95	8.35	.....	.....	.....	.....	.....
Rankin, Pa. A5	164	176	.....	190	184	7.95	8.35	.....	.....	.....	.....	.....
So. Chicago R3	167	181	.....	195	189	8.10	8.50	.....	.....	.....	.....	.....
S. San Francisco C6	166	178	.....	192	186	8.05	8.45	.....	.....	.....	.....	.....
Sparrows Pt. B3**	166	178	.....	192	186	8.05	8.45	.....	.....	.....	.....	.....
Struthers, O. Y1*	166	178	.....	192	186	8.05	8.45	.....	.....	.....	.....	.....
Worcester A5	170	185	.....	195	189	8.25	8.65	.....	.....	.....	.....	.....
Williamsport, Pa. S5	167	181	.....	195	189	8.20	8.60	.....	.....	.....	.....	.....

* Zinc less than .10¢. † Plus zinc extras.
** 13.5 zinc. ‡ Wholesalers only.
*** .10¢ zinc.

C-R SPRING STEEL

City	City Delivery & Charge	CARBON CONTENT				
		0.28-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Baltimore, Md. T8		8.25	10.10	12.90	15.30	18.25
Bristol, Conn. W12		7.95	9.80	12.60	15.00	18.25
Boston T8		8.50	10.10	12.90	15.30	18.25
Buffalo, N. Y. R7		7.95	9.80	12.60	15.00	17.95
Carnegie, Pa. S9		7.95	9.80	12.60	15.00	17.95
Cleveland A5		7.95	9.80	12.60	15.00	17.95
Detroit D1		8.05	9.90	12.70	15.10	18.25
Detroit D2		8.05	9.90	12.70	15.10	18.25
Dover, O. C4		7.95	9.80	12.60	15.00	17.95
Franklin Park, Ill. T8		8.05	9.90	12.60	15.00	17.95
Harrison, N. J. C11		8.10	9.95	12.60	15.00	17.95
Indianapolis C5		8.10	9.95	12.60	15.00	17.95
New Castle, Pa. B4		7.95	9.80	12.60	15.00	17.95
New Haven, Conn. D1		8.40	10.10	12.90	15.30	18.25
Pawtucket, R. I. N7		8.50	10.10	12.90	15.30	18.25
Pittsburgh S7		7.95	9.80	12.60	15.00	17.95
Riverside, Ill. A1		8.05	9.90	12.60	15.00	17.95
Sharon, Pa. S1		7.95	9.80	12.60	15.00	17.95
Trenton R4		8.10	9.95	12.60	15.00	17.95
Wallingford W1		8.40	10.10	12.90	15.30	18.25
Warren, Ohio T4		7.95	9.80	12.60	15.00	17.95
Wheaton, W. Va. W3		7.95	9.80	12.60	15.00	17.95
Worcester, Mass. A5		8.50	10.10	12.90	15.30	18.25
Youngstown C5		7.95	9.80	12.60	15.00	17.95

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rail	Light Rail	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer U1	5.075	6.00	6.35				
Se. Chicago R3				8.775			
Ensley T2	5.075	6.00	6.35				
Fairfield T2		6.00	6.35	8.775	6.025		
Gary U1	5.075	6.00	6.35		6.025		
Ind. Harbor J3	5.075	6.00	6.35	8.775	6.025		
Ind. Harbor Y1				8.775			
Johnstown B3		6.00					
Juliet U1	5.075	6.35					
Kansas City S2				8.775			
Lackawanna B3	5.075	6.00	6.35		6.025		
Lebanon B3						13.10	
Minnesota C6	5.075	6.50	6.35	8.775	6.025	13.10	
Pittsburgh P5				8.775	12.85		
Pittsburgh J3				8.775		13.10	
Seattle B2				9.275	6.175	13.16	
Suehiro B3	5.075	6.35			6.025	13.10	
Struthers Y1				8.775			
Terrace C7							
Williamsport S3		6.15					
Youngstown R3				8.775			

COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa. \$15.25 to \$15.75
Foundry, beehive (f.o.b. oven) \$18.00 to \$19.00

Foundry, oven coke

Buffalo, del'd	\$30.75
Detroit, f.o.b.	29.50
New England, del'd	30.55
Seaboard, N. J., f.o.b.	28.75
Philadelphia, f.o.b.	28.50
Swedesland, Pa., f.o.b.	28.50
Painesville, Ohio, f.o.b.	29.50
Erie, Pa., f.o.b.	29.50
Cleveland, del'd	31.55
Cincinnati, del'd	29.59
St. Paul, f.o.b.	28.50
St. Louis, f.o.b.	30.50
Birmingham, f.o.b.	27.60
Milwaukee, f.o.b.	29.50
Lone Star, f.o.b.	25.50

ELECTRODES

Cents per lb f.o.b. plant, threaded, with
nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	24.75	40	100, 110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2 1/2	30	37.25			
2	24	57.75			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes	
(Cents per lb, f.o.b. shipping point)	
Copper	
Cast elliptical, 18 in. or longer, 5000 lb lots	57.42
Electrodeposited	46.28
Brass, 80-20, ball anodes, 2000 lb or more	58.00
Zinc, ball anodes, 2000 lb lots	21.25
(for elliptical add 2¢ per lb)	
Nickel, 99 pct plus, rolled carbon...	90.50
(rolled depolarized add 3¢ per lb)	
Cadmium	21.70
Tin, ball anodes and elliptical \$1.10 to \$1.16	
Chemicals	
(Cents per lb, f.o.b. shipping point)	
Copper cyanide, 100 lb drum	80.50
Copper sulphate, 5 or more 100 lb bags, per cwt.	20.65
Nickel salts, single, 100 lb bags...	38.35
Nickel chloride, freight allowed, 300 lb	43.50
Sodium cyanide, domestic, f.o.b.	
N. Y., 300 lb drums	21.55
(Philadelphia price \$1.80)	
Zinc cyanide, 100 to 900 lb...	55.55
Potassium cyanide, 100 lb drum	
N. Y.	48.00
Chromic acid, flake type, 1 to 20 100 lb drums	29.25

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct Discounts

Machine and Carriage Bolts	Full Con- tainer Price	30 Con- tainers	20,000 Lb.	40,000 Lb.
1/4" and smaller x 6" and shorter	55	58 1/2	60 1/2	61 1/2
1/4" thru 1" x longer than 6"	46 1/2	50	52 1/2	54
Roller thread carriage bolts 1/2 in. & smaller x 6 in. and shorter	55	58 1/2	60 1/2	61 1/2
Lag, all diam. x 6" & shorter	55	58	60	61
Lag, all diam. longer than 6 in.	47	50	52	53
Plow bolts, 1/4" and smaller x 6" and shorter	54	57 1/2	59	60

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.

Full Case or
Keg Price

3/4 in. or smaller	63
1/2 in. to 1 in. inclusive	59 1/2
1 1/4 in. to 1 1/2 in. inclusive	64
1 1/2 in. and larger	58

C.P. Hex regular & hvy.

3/4 in. and smaller	63
1/2 in. to 1 1/4 in. inclusive	59 1/2
1 1/4 in. and larger	58

Hot Galv. Nuts (All Types)

3/4" and smaller	50
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Semi-finished Hex Nuts

3/4 in. and smaller	63
1/2 in. to 1 1/4 in. inclusive	59 1/2
1 1/4 in. and larger	58

(Add 25 pct for broken case or keg
quantities)

Finished

1" and smaller	65
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Rivets

	Base per 100 lb
1/2 in. and larger	\$10.85
7/16 in. and smaller	Pct Off List
	26 1/2

Cap Screws

Discount (Packages)
Bright Treated H. C. Heat

New std. hex head, pack- aged	
1/2" diam. and smaller x 6" and shorter	47 34
3/4" and 1" diam. x 6" and shorter	31 13
1" diam. and smaller x longer than 6"	18 1/2 + 1
3/4", 1/2" and 1" diam. & longer than 6"	5 1/2 + 19 1/2

C-1018 Steel
Full-Finished
Cartons Bulk

1/4" through 3/4" dia. x 6"	47 63
3/4" through 1" dia. x 6"	31 51 1/2
and shorter	
Minimum quantity—1/4" through 3/4" diam., 15,000 pieces; 1/2" through 3/4" diam., 5,000 pieces; 3/4" through 1" diam., 2,000 pieces.	

Machine Screws & Stove Bolts

Plain Finish	Discount	Mach. Screws	Stove Bolts
Cartons	19	32	
Bulk	Quantity		
To 1/4" diam. incl.	25,000-200,000	9	54
5/16 to 3/8" diam. incl.	15,000-100,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screw & Stove Bolt Nuts

In Bulk	Discount	Hex	Square
	16	19	
Quantity			
1/2" diam. & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	119.0
New York	131.4
Chicago	133.4
San Francisco-L. A.	140.2
Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Ex- planation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.	

REFRACTORIES

Fire Clay Brick	Carloads per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5.00)	\$128.00
No. 1 Ohio	128.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$2.00)	20.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$140.00
Childs, Hays, Pa.	145.00
Chicago District	160.00
Western Utah	144.00-165.00
California	170.00
Super Duty	
Hays, Pa., Athens, Tex., Wind- ham, Warren, O., Morrisville	150.00-157.00
Silica cement, net ton, bulk, Latrobe	26.50
Silica cement, net ton, bulk, Chi- cago	24.00
Silica cement, net tons, bulk, Ens- ley, Ala.	25.50
Silica cement, net ton, bulk, Mt. Union	23.00
Silica cement, net ton, bulk, Utah and Calif.	35.00

Chrome Brick

Standard chemically bonded, Balt.	Per net ton
Standard chemically bonded, Curt- ner, Calif.	\$98.00
Burned, Balt.	105.00
	92.00

Magnesite Brick

Standard, Baltimore	\$121.00
Chemically bonded, Baltimore	109.00

Grain Magnesite St. 3/4 to 1/2-in. grains

Domestic, f.o.b. Baltimore in bulk.	\$69.40
Domestic, f.o.b. Chewah, Wash., Luning, Nev.	
In bulk	43.00
In sacks	49.00

Dead Burned Dolomite

F.o.b. bulk, producing points in:	Per net ton
Pa., W. Va., Ohio	\$16.00
Midwest	16.35
Missouri Valley	15.00

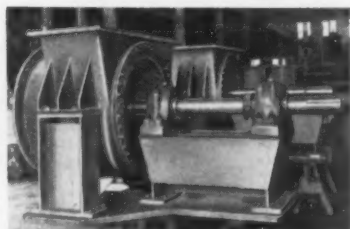
METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh	
Swedish sponge iron f.o.b.	
Riverton, N. J., ocean bags	8.50¢
Canadian sponge iron	
Del'd in East, carloads...	9.5¢
Domestic sponge iron, 98+%	
Fe, carload lots	8.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+% Fe	\$6.0¢ to \$1.55
Aluminum freight allowed	38.00¢
Brass, 10 ton lots	\$7.50¢ to \$9.00¢
Copper, electrolytic	59.50¢
Copper, reduced	59.50¢
Cadmium, 100-199 lb., 99.5% plus metal value	
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd.	\$5.00
Lead	8.90¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	\$3.35 to \$3.85
Nickel, unannealed	\$1.00
Nickel, annealed	\$1.06
Nickel, spherical, unannealed	\$1.13
#20	43.50¢
Solder power...	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	99.0¢
Stainless steel, 316	\$1.33
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	\$4.50
Zinc, 10 ton lots	18.75¢ to 22.50¢

KUTZTOWN *Skill*

CREATES LARGE PUMPS of special design

These large pumps, with each section bolted together, were completely machined and assembled in our plant. Here they are being prepared for the boring of the inside diameter.



While to some it may seem relatively unimportant for us to have adequate machining capacity, however, many of our customers rely on us to rough and finish machine their castings for assembly. We have equipment capable of boring, turning and facing a casting up to 16 feet in diameter. Our planers can easily finish work up to approximately 20 feet in length on 60 inch open side tables. Drill presses, with up to seven foot arms, handle adequately the drilling of large castings. Then too, our machinists, in whose hands are placed the finishing of some of the most intricate castings, have the training, experience and the necessary attitude toward their work, that, added together, means the finest finished product.

No order is too large or small for Kutztown to handle. Your inquiry is most welcome.

We'll be happy to place your name on our mailing list to receive regular issues of the "Kutztown REVIEW."

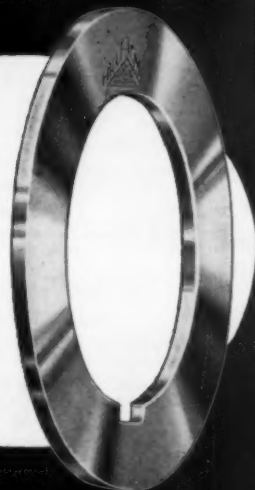
KUTZTOWN FOUNDRY & MACHINE CORP.

KUTZTOWN, PENNSYLVANIA

"CLEVELAND"

Rotary Slitting and Side Trimmer Knives

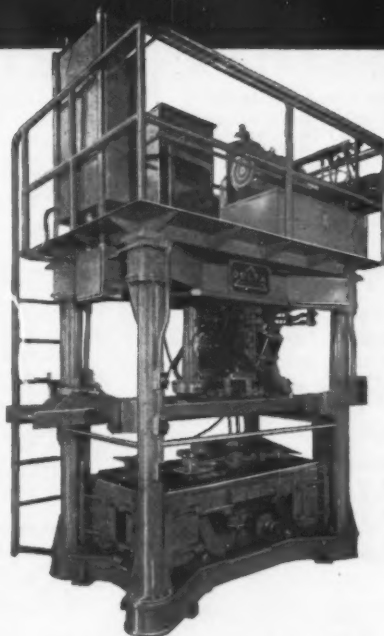
It's the quality of the tool steel plus 40 years of "Know How" that insure CLEVELAND KNIFE users of complete satisfaction. "CLEVELAND" Knives are made in "Alloy", "Century", "Peerless" and "High Speed" grades to meet every metal cutting condition.



THE HILL ACME COMPANY

CLEVELAND KNIFE DIVISION

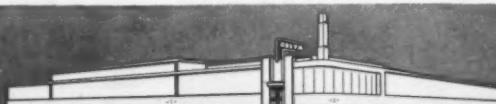
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DELTA WELDER CORPORATION

8525 Livernois

Detroit 4, Michigan

Ferroalloy Prices

(Effective Nov. 13, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, 30-1.00% max. Si.			
0.02% C	41.50	0.20% C	38.50
0.03% C	41.00	0.50% C	38.25
0.06% C	39.50	1.00% C	37.50
0.10% C	39.00	1.50% C	37.35
0.15% C	38.75	2.00% C	37.25
4.00-4.50% C	37.70	Cr, 1-2% Si	27.75
3.50-5.00% C	57-64% Cr, 2.00-4.50% Si		27.75
0.025% C (Simplex)			34.75
0.10% C, 50-52% Cr, 2% max Si			35.75
8.50% max. C, 50-55% Cr, 3-6% Si			24.00
8.50% C, 50-55% Cr, 3% max Si			24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.	
0.10% max. C	\$1.31
0.50% max. C	1.31
9 to 11% C, 33-91% Cr, 0.75% Fe.	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (1/4" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.	
Carloads	\$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 8-in. x down, per lb of Cr, packed.	
Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.	
80-33% Cr, 60-65% Si, 3.00 max. Fe.	
Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.	
16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads	24.25
Ton lots	25.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr. 20% Fe 1/4 in. x 12 mesh.	
Ton lots	20.15
Less ton lots	21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 33-42% Cr., 17-19% Si, 8-11% Mn, packed.	
Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidex No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.	
Carload packed	18.50
Ton lots to carload packed.	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.	
	Cents per-lb
Producing Point	
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.75
Johnstown, Pa.	11.75
Sheridan, Pa.	11.75
Philo, Ohio	11.75
S. Duquesne	11.75
Add or subtract 0.1¢ for each 1 pct Mn above or below base content.	
Briquets, delivered, 66 pct Mn:	
Carloads, bulk	13.90
Ton lots packed	16.30

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.	
Manganese Silicon	
16 to 19% 3% max.	\$97.50
19 to 21% 3% max.	99.50
21 to 23% 3% max.	102.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.	
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.	
Carload, packed	45.75
Ton lots	47.35

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.	
Carloads	33.00
Ton lots	35.00
250 to 1999 lb	37.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn.	
	24.15

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.			
	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	35.80	32.60	32.80
0.07% max. C	33.75	35.55	27.75
0.10% max. C	33.00	35.80	37.00
0.15% max. C	32.25	35.05	36.25
0.30% max. C	30.75	33.55	34.75
0.50% max. C	30.25	33.05	34.25
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	27.25	30.05	31.25

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 13-20% Si, 1.5% max. C for 3% max. C, deduct 0.2¢ f.o.b. shipping point.	
Carloads bulk	12.95
Ton lots	14.40
Briquet contract basis carloads, bulk, delivered, per lb of briquet	14.40
Ton lots, packed	16.80

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area.	
Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.	

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.	
	Ton lots Carloads
98.50% Si, 2% Fe	23.95 22.65
98% Si, 0.75% Fe	24.45 22.15

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 1 lb Si. briquets.	
Carloads, bulk	7.55
Ton lots, packed	10.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.	
50% Si	13.50 75% Si 16.40
65% Si	15.25 85% Si 18.15
90% Si	19.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.	
	Cast Turnings Distilled
Ton lots	\$2.05 \$2.95 \$3.75
Less ton lots	2.40 3.30 4.55

Ferrovandium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.	
Openhearth	3.20
Crucible	3.30
High speed steel (Primos)	3.40

Alsiifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound Contained Mo. \$1.25

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	\$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb cont'd Sb plus Ta. \$4.95

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo. \$1.54

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$4.00 unitage, per gross ton \$90.00 10 tons to less carload \$110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti \$1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti \$1.50 Less ton lots \$1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton \$215.00

Ferrotungsten, 1/4 x down, packed, per pounds contained W, ton lots delivered \$3.15

Molybde oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. \$1.32

base, f.o.b. Washington, Pa. Langeloth, Pa. \$1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb. Carload, bulk lump \$18.50¢ Ton lots, packed lump \$20.50¢ Less ton lots \$21.00¢

Vanadium oxide, 86-89% V₂O₅ contract basis, per pound contained V₂O₅ \$1.38

Zirconium contract basis, per lb of alloy 35-40% f.o.b. freight allowed, carloads, packed \$27.25¢ 12-15%, del'd lump, bulk-carloads \$9.25¢

Boron Agents

Borasil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B \$5.50

Bortan, f.o.b. Niagara Falls Ton lots, per pound \$45¢ Less ton lots, per pound \$50¢

Corbortan, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed Ton lots per pound \$14.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots \$1.30 F.o.b. Wash., Pa. Niagara Falls, N. Y., delivered 100 lb up \$1.30 10 to 14% B \$1.20 14 to 19% B \$1.20 19% min. B \$1.60

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over No. 1 \$1.05 No. 79 \$0.60

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd \$1.46 Less ton lots \$1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Fe, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots \$2.05



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FOR FINER FORGINGS AND FASTENERS, let RITCO meet your design requirements . . . save you machining time and money!

Clean, accurate RITCO Forgings . . . Drop or Upset . . . are made to blueprint specifications in many metals and in weights from ¼ to 15 pounds. Their smooth, flash-free finish and tremendous

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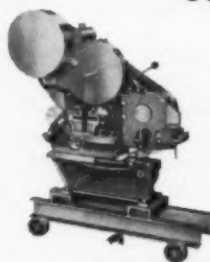
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Cutting Flat Bars up to . . . ¾"
Cutting Rounds up to . . . 1½"
Cutting Squares up to . . . 1½"
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Cutting Angles & Tees in mitres
0-45° . . . ¾ x 2"
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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Pinched Supply . . . Plenty of inquiries but a shortage of the right models: That's the picture for used machinery and equipment in Pittsburgh. Cranes are coming onto the market in fairly good quantities but most types of equipment are unusually tight.

Steel mill equipment is feeling the general supply pinch, although one dealer says business is continuing at a satisfactory level. Bar mills are very hard to find. Flat rolling mills are a little more plentiful, but one dealer says the types that are turning up are mostly the old hand models.

Now You See It . . . No blooming mills are coming to dealers at the present time. There is a market for the heavy mills but no supply. Plate mills are being moved but here again steel producers are tending to hang on to what they have. A 100-in. plate mill was offered by a producer, then withdrawn as demand for plate made operation of the mill more profitable. Same thing happened on a bar mill.

South of the Border . . . Mexico continues to be an active market for mill equipment as a mill for bars and light structurals was recently sold there. But import regulations are a problem. A large hot strip mill was held up five months some time ago, pending clearance of motors and controls.

Mexico's policy seems to be that equipment with large, integral motors can be admitted but that smaller, independent motors must be supplied locally.

A crane dealer has had similar troubles on shipments to Mexico and says situation is complicated by the fact that local intermediaries can't be contacted for help. Only the principals can take part in negotiations with the government. However, one crane sale was recently cleared and another is in the offing.

Cranes Popular . . . Overall the crane market is active. Inquiries are coming in at a good rate; the switch of the railroad from steam to diesel continues to turn loose ash pit cranes. The problem is to match the available supply with customer requirements. Cab control or floor control; ac or dc power; different voltages and clearances are some of the points that must be checked in meeting customer needs.

In the main, crane buyers are looking for models with 60-75 ft spans and capacities ranging from 5 to 15 tons.

General Machine Outlook . . . On general machinery, there is a lively demand for all types of heavy fabricating equipment and for standard machine tools. One dealer says that business was good up until about a month ago but that now a lack of the right models has brought sales to a standstill.

Another source says there have been a few sales of presses in the area but that no machine tools are turning up. Customers aren't interested in tools that go back past 1942 and that's all dealers can find.



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"Hello, Scudder and Son? You can go ahead on that swimming pool!"

CONSIDER GOOD USED EQUIPMENT FIRST

BENDER & STRAIGHTENER

#4 H & J, Capacity 15" I-beams, 9" Girder Rail,
100 lb. Tve Rails, Motor Drive

BENDING ROLLS

6" x 16" Niagara Initial Type
8" x 16" Webb 129-V Vertical
10" x 16" Bertch Initial Type
10" x 16" Kling Pyramid Type
12" x 16" Southwark Pyramid Type
16" x 16" Niles Pyramid Type
20" x 16" Hillis & Jones Pyramid Type

BRAKES—LEAF TYPE

10" x 16" Drels & Krump
12" x 16" Drels & Krump
12" x 16" Drels & Krump

BRAKES—PRESS TYPE

10" x 16" Superior Hydraulic—NEW
12" x 16" Superior Hydraulic—NEW
10" x 16" Cincinnati—LATE
12" x 16" Niagara—LATE

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton Whiting 48" Span 220/300 A.C.
5 ton Shaw 56" Span 220 Volt D.C.
10 ton Cyclops 48" Span 220/440 A.C.
15 ton P&H 48" Span 220 Volt D.C.
25 ton L-H 75" Span 220/300 A.C.
30 ton Niles Incl. 300 ft. Runway
120 ton Niles 72" Span 330 Volt D.C.
120 ton Niles 68" Span 440/300 A.C.

FORGING MACHINES

1" to 5" Acme, Ajax, National
3" Ajax—Air Clutch
HAMMERS—BROAD DROP—STEAM DROP—STEAM
FORGING—500 lb. to 20,000 lb.

LEVELLERS—ROLLER

44" Newbold, Nine Rolls 4" Dia.
54" Aetna Standard, 17 Rolls 3 1/2" Dia.
72" McKay, 17 Rolls 4 1/4" Dia.

PRESSES—HYDRAULIC

500 ton Elmes 18" Stroke Lower Platen 38" x 66"
750 ton Baldwin Triple Acting Bolster 84" x 133"
1200 ton United States Hydraulic Forging Press
4500 Baldwin-Lima-Hamilton Hydr. Forging Press

PRESS—INCLINED

125 ton Beatty Open Back, 1 1/2" Stroke. Area of Bed
28 1/2" x 36 1/2"

PRESSES—STRAIGHT TYPE

Clearing Model TF41500-200 Triple Acting Strokes
40 32, 14", Bed Area 100" x 200"
100 ton Clearing 14" Stroke, 36" x 36" Bed
250 ton Bliss, 16" Stroke, 29" x 29" Bed
250 ton Toledo, 6" Stroke, 36" x 72" Bed

PUNCH—BEAM

#7 Kling Universal Punch, Capacity Punch 1 1/2" x 1"
118 Ton Punches in Range & web of H-Beams,
I-Beams & Channels

PUNCH & SHEAR COMBINATIONS

ME-10 Pels Ironworker, Capacity Punch 1/2" x 1/2",
Shear 1 1/2" Rd. 1 1/2" Sq. 3 x 3 x 1/2" Angles
#44 x 48 Buffalo BAP, Capacity 1/2" x 1/2"
Cleveland Style G Single End, 60" Throat
No. 1 1/2 Buffalo Universal Ironworker

ROLLS—PLATE STRAIGHTENING

12" Bertch Chen Rolls 12" Dia.
86" H & J, Six Rolls 10" Dia.
12" Newbold, Nine Rolls 14" Dia.

ROLLING MILLS

10" x 16" Single Stand, Two High
12" x 14" Twelve Stand, Two High Strip Mill

12" x 16" Phila. Single Stand, Two High
15" x 18" O & M Single Stand, Two High
16" x 24" Farrel Two Stand, Two High
20" x 60" Two High Breakdown Mill
28" x 54" United Single Stand, Two High
36" x 72" Cold Rolling Mill
44" x 144" Three High Sheet Mill
22" x 46" Three High Sheet Mill

SHEAR—GATE

80" x 1/2" Pels Model S T A U—22, All Steel

SHEARS—ROTARY

#22A Quickwork Whiting, 3/16" Capr.
#250 Kling, 1/2" Capr.

SHEARS—SQUARING

8" x 1/2" Niagara, LATE
16" x 1/2" Cincinnati, LATE
16" x 1/2" Toledo

SLITTERS

12" Blake & Johnson
21" Custom Built Slitting Line.

SWAGING MACHINE

#65A Penn, Capacity 2 1/2" Tube, 3 1/2" Solid 10"
Die Length, Hydraulic Feed, LATE

TESTING MACHINES

60,000, 100,000, 200,000 Olsen & Riehle Universal
50,000 and 300,000 lb Compression

TUBE MILL

Etna IK Welded Tube Mill, Cut-off & Transformer
Capr. 1/2" OD 0.28 wall to 2" OD .120 wall

WELDING POSITIONER

14,000# Cullen Priestest Model #140, 220/440

WIRE DRAWING MACHINE

BBS-13 Synco Fine Wire Drawing Machine

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No. 5 Abrasive 12" x 60" surface grinder.
72" Hanchett 3-sd. rotary surface, new 1946.
14" x 36" Pratt & Whitney hyd. vert. surface, 1942.
15" x 60" Model 300 Hanchett vert. spdl. surface
grinder, 1946.
No. 74 Heald hyd. pl. Internal, X-sliding H. S., 1941.
16" x 36" Landis type C hyd. pl. cylindrical, 1942.

HAMMERS

No. 3C Chambersburg pneumatic, serial No. 2297.
No. 6-1 Nazel, pneumatic, late.
No. 6B Nazel, self-contained.

LATHES

No. 3 Gisholt Univ. Turret Lathes (2), 1942.
No. 5 Gisholt ram type Univ. Turret Lathes, 1940.
14" x 6" Hendey Torsion, 1940.
15" x 30" Line Carbo-Matic, 1942.
36" and 42" Bullard New Era vertical turret lathes.
126" x 96" CC Niles Belmont Ford engine lathe, 60
HP, M.D.

MILLING MACHINES

No. 2 Brown & Sharpe vertical mill, new 1943.
No. 4 Cincinnati high power plain horizontal mill,
serial E 506 J.
No. 5-48 Cincinnati hydromatic duplex mill, serial
3B51DK-5.
No. 2-24 Cincinnati automatic simplex mill, serial
No. 1B3PIT-1.

PRESSES

80 ton No. 92 1/2 Toledo D.C. Str. Side.
200 ton No. 7-72 Bliss S.S. D.C. Press, Air Clutch.
260 ton No. 790 1/2-72 Toledo D.C. Tangle drawing.
350 ton Elmes self-cent. 4-post Hydraulic Press, 1944.
500 ton No. 1539 Hamilton O.C. sd. bed, 90" x 192".
2000 ton No. 6 National Maxiress Forging Press.

SHAPERS & SLOTTERS

24" Gould & Eberhardt Universal.
32" O & E Invinible, F.M.D.
36" Rockford hyd. vertical slotter, new 1944.

UPSETTERS

1 1/2" National Upsetter, guided ram, hard ways.
3 1/2" Ajax suspended slides, steel frame.
4" National high duty, susp. & guided rams.
7 1/2" National Upsetter, air clutch, new 1944.

1000 Tools in Stock

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Bliss No. 19-C Press with D.R. feeds, M.D.
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No. 2 Press-Rite Presses with air clutch.
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3 phase—60 cycle

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Qu.	H.P.	Make	Type	Volts	Speed
2	1750	G.E.	M-79BS	4800	1800
1	1500	G.E.	MT	6600	257
1	1100	F.M.	OVZK, B.B.	4800	1800
1	1000	A.C.	MII	2200	240
1	800	G.E.	MT	2300	293
1	750	G.E.	MT-573	2200	1190
1	700	A.C.		2300	500
1	500	Whase.	CW	550	350
1	400	Whase.	CW-960A	440	1170
1	400	Whase.	CW	440	514
1	400	Whase.	CW-1213	2200	435
1	350	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	MT-559S	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	20QB	440	505
1	200	G.E.	IM	440	435
1	200	G.E.	IM	2200	580
1	150 (unused)	Whase.	CW	2200	435
2	125	A.C.		440	865
1	125	Al. Ch.		440	720
1	100	G.E.	IM-16	2200	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

SQUIRREL CAGE

1	800	G.E.	KT-573	2200	1180
2	650	G.E.	FT-559BY	440	3570
1	450	Whase.	CR-1420	2300	4150
1	400	G.E.	TK	2200	500
1	200	G.E.	TK-17	440	580
3	200	G.E.	KT-557	440	1800
1	150/75	G.E.	TK	440/900/450	
1	150	Whase.	CRS56S	440	880
1	150	Whase.	CR	440	880
2	125	Al. Ch.	ARW	2200	1750

SYNCHRONOUS

1	7000	G.E.	ATI	2200/6600	600
1	4350	C.W.	3501RL4000/6900/13800	514	
1	2850	Whase.	.8 p.f.	2300/4600	514
1	2000	Whase.	.8 p.f.	2300	720
2	2000	Whase.		2300	120
2	1750	G.E.	ATI	2300	3600
1	735	G.E.	ATI	2200/12600	600
1	500	G.E.	TS-7567	2200	1260
1	450	Whase.		2200	125.5
1	325	G.E.	ATI	440	1800
1	225	G.E.	ATI	440	1800

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1—10" Niles Heavy Duty Vertical Boring Mill, 2 Hds.
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4" National Upsetter High Duty, guided over-
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Ajax & National Upsetters, suspended slides,
2 1/2", 3", 4"; similar upsetters not suspended
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5" Acme Upsetting & Forging Machines susp-
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700-ton Ajax High Speed Forging Press

50,000# Standard Double Draw Bench

#3 Abramson Bar & Tube Straightener

Pels FV-75 Bar & Miller Shear, Cap. 7 1/2" rd
10" x 1/2" Plate Shear, Long & Allstatter 18"
throat, M.D. Rebuilt

Also 10" x 3/4" L & A

Hillis & Jones and Buffalo Shears 1 1/2", 2",
2 1/2", 3", 3 1/4", 4" and 4 1/4"

1600 Chambersburg Model F Board Drop Ham-
mers, Roller bearing; double V-ways, Built
1943

1500 lb. Niles Steam Forging Hammer

Bradley Hammers, various sizes, including
500# Upright

Nazel Air Forging Hammers, #2-B, 5-N

Williams White Bulldozers, #22, #3, #4, #25,
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Landis Landmaco and other Landis Threading
Machines from 1/8" to 4"

Single and Double End Punches

Angle Shear H. & J. 4 x 4 x 1"

No. 3 Match & Merryweather Saw, with Saw
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Wide assortment of heating treating furnaces,
electric and oil

BOLT, NUT AND RIVET MACHINERY, COLD
HEADERS, THREAD ROLLERS, THREADING
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MERS, SLOTTERS, HOT HEADERS AND TRIM-
MERS, COLD AND HOT PUNCH NUT
MACHINES.

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MERS, COLD AND HOT PUNCH NUT
MACHINES.

Donahue Steel Products Co.

1919 W. 74th Street, Chicago 36, Ill.

BOLT, NUT AND RIVET MACHINERY, COLD
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- 1—MERCHANT BAR MILL to produce 1" to 4 1/2" inclusive rd or sq., 14 stands, 2 vertical edging stands, two cooling beds, saw and shears.
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- 1—TABLE, mill approach, 45' long with 15" dia. rollers, 3/8" face, spaced on 18" centers.
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2	100	495	G.E.	MT-563	230/440
1	100	570	G.E.	MT-563	230/440
1	100	870	Whse.	CW	230/440
1	100	880	EL. Dry.	EDX-613	230/440
1	100	1160	Whse.	CW	230/440
1	100	635	Whse.	CW1000	230/440
1	150	490	Whse.	CW	230/440
1	150	570	Whse.	CW	230/440
1	150	705	AL. Ch.	ANY	230/440
1	200	490	G.E.	IM-14	2200
3	200	555	G.E.	IM-16	2200
1	250	1760	G.E.	IM-15B	2200
1	250	300	G.E.	MT-414	2200
1	250	705	AL. Ch.	ANY	230/440
1	350	450	G.E.	MT-412	2200
1	400	490	Whse.	CW	2200
1	400	505	AL. Ch.	ANY	2200
2	450	440	Whse.	CW	2200
1	500	450	G.E.	IM	2300
2	500	505	AL. Ch.	ARY	2300
1	700	295	Whse.	CW	2300
1	750	400	G.E.	IM	2300
1	1000	445	Whse.	CW	2300
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8	2500	257	G.E.	Mill type	2300

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Qu.	H.P.	R.P.M.	Mkts	Type	Volt
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1	2000	900	Whse.	.8 PP	2200
1	1500	514	Whse.	.8 PP	2300
1	1000	1200	EL. Mch.	.8 PP	440
1	1000	900	G.E.	.8 PP	2300
1	710	720	G.E.	.8 PP	440/2300
1	450	128	Whse.	1.0 PP	2200
1	300	720	G.E.	TS 982	440/2300
1	300	600	G.E.	TS 7656	2200
2	280	900	Cr. Wh.	.8 PP	2300
1	250	600	Whse.	.8 PP	220/440
1	200	514	AL. Ch.	1.0 PP	2300
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1	200	360	AL. Ch.	1.0 PP	440/2300/4
1	150	900	G.E.	ATI	2300
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1	150	600	G.E.	TS 7661	550
2	125	900	G.E.	TS 983	4000/2300
1	125	900	EL. Mch.	1.0 PP	4000/2400
1	125	900	G.E.	TS 7556	2200
2	100	1000	Whse.	.8 PP	220/440
1	100	900	Idol	.8 PP	220/440
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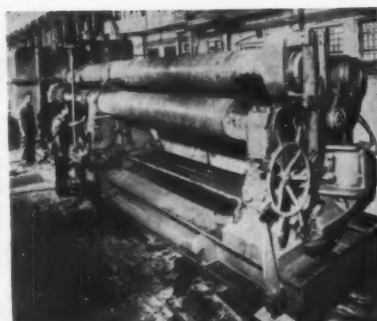
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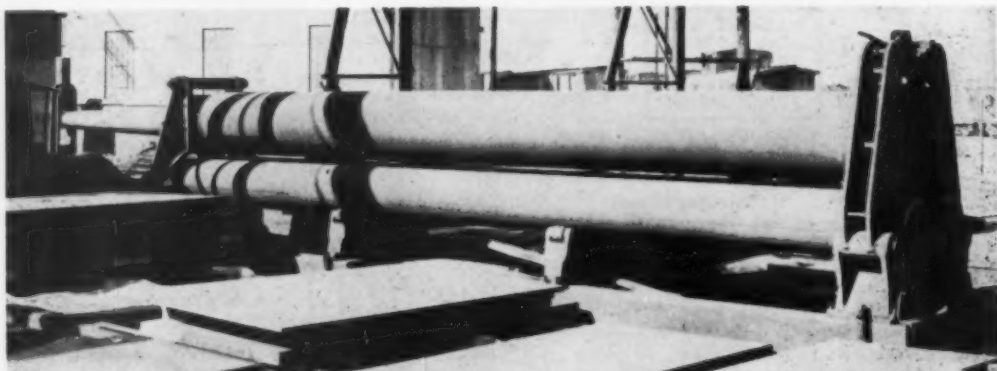
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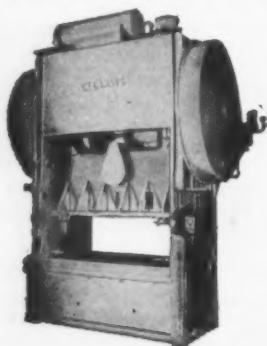
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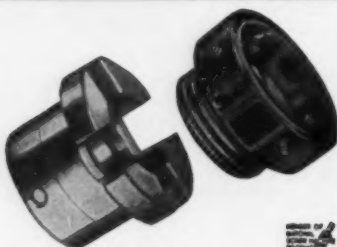
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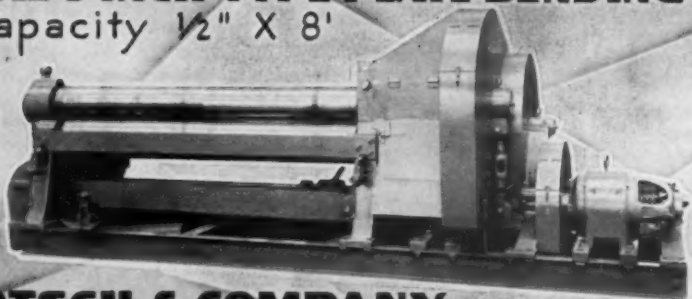


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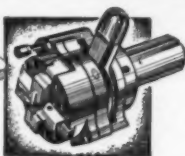


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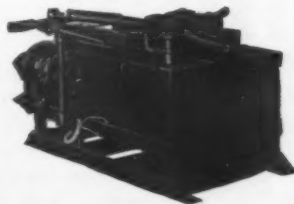
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Plate Famine See For Five Years

Five more years of shortages in heavy steel plate supply was predicted by Charles Lukens Huston, Jr., president of Lukens Steel Co. Aggravating these shortages, stemming from insufficient facilities, will be the government's \$50 billion road program, the petroleum industry's \$33 billion expansion program, an estimated \$60 billion in new construction, and the probability of a revived shipbuilding industry.

October Steel Output Sets Record

Record production by individual mills during October added up to the biggest steel production month in U. S. history, the Iron and Steel Institute reports. The Institute estimates 11,032,000 net tons of ingots and steel for castings were poured by the industry in October. The previous record of 10,501,050 tons was set last March. Output during the first week in November, however, dropped slightly. The Institute estimated production last week at 2,463,000 net tons, with steelmaking operations at 100.1 pct of rated capacity.

Republic Tops Production Marks

Republic Steel Corp. broke its monthly blast furnace and steel production records in October. Its blast furnaces turned out 659,600 tons of pig iron, nearly 14,000 tons better than the old peak reached in May of this year. Steel output totaled 941,800 ingot tons, approximately 12,000 tons more than produced in March, 1953, the previous high.

Transformer Prices Cut By Westinghouse

Westinghouse Electric Corp. announced lower prices for many of its power transformers. Affected are transformers rated at 300 kv amps and above, and which are specially designed to meet customer needs for units having lower-than-standard noise levels. Additional costs charged for transformers with a sound level lower than the recommended NEMA standards have been cut as much as 75 pct.

Rail Strike Idles Donora Works

American Steel and Wire Div.'s Donora Works has been idled by a strike of Donora and Southern Railroad trainmen. The stoppage began Nov. 10 and has resulted in a loss of 2500 ingot tons of steel daily since that time. The railroad operates the diesel locomotives that serve Donora openhearth.

New Coil Car Protects Steel Shipments

A railroad car designed to permit transportation of coil steel with a minimum of damage and at lower cost has been devised by Evans Products Co., Plymouth, Mich. Called a coil car, it is made of two metal shells laid lengthwise on a standard flatcar. The encasement can be cranked open or shut by one man to permit loading or unloading.

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A	
Acme Equipment Co.	211
*Acme Welding Div. of The United Tool & Die Co.	168
*Air Reduction	184
Airline Welding & Engineering ..	9
Ajax Electric Co.	4
Ajax Electro Metallurgical Corporation ..	4
Ajax Electrothermic Corp.	4
Ajax Electric Furnace Corp.	4
*Alco Products, Inc.	179
*Alamite Div., Stewart Warner Corp.	129
*Allegheny Ludlum Steel Corp.	86
*Allied Research Products, Inc.	197
Allis-Chalmers Mfg. Co.	123
*Aluminum Co. of America	184
American Bridge Division United States Steel Corp.	51
American Gas Association	42
American Optical Co.	56
*American Pulverizer Co.	186
Arco Corp.	164 & 165
Armstrong, James P.	211
*Armstrong-Blum Manufacturing Co.	116
*Armstrong Bros. Tool Co.	215
Associated Spring Corp.	48
Austin Mfg. Corp.	214
*Axelson Mfg. Co., Inc., Div. of U. S. Industries, Inc.	37
B	
Babcock & Wilcox Co., The Refractories Div.	71
*Baker & Company, Inc.	167
Baldt Anchor, Chain & Forge Div.	214
Baltimore & Ohio Railroad	61
Barium Steel Corp.	45
Barnes, Wallace Co., Div.	48
Barnes-Gibson-Raymond, Inc., Div. Associated Spring Corp.	48
Bay State Abrasive Products Co.	32 & 33
*Beatty Machine & Mfg. Co.	174
Belyea Co., Inc.	209
Bennett Machinery Co.	209
Berlich & Company	215
Bethlehem Steel Co.	1
Birdsboro Steel Fdry. & Machine Co.	54
Black & Decker Mfg. Co., The	53
Blaw-Knox Company, Foundry & Mill Machinery Division ..	26 & 27
*Bliss & Laughlin, Inc.	16
*Boston Gear Works	79
Bradley, C. C. & Son	215
Browning, Victor R. & Co., Inc.	215
Bucyrus-Erie Co.	193
*Buffalo Bolt Co., Division Buffalo-Eclipse Corporation	172
*Burt Mfg. Co., The	49
C	
*Carborundum Co., Refractories Div.	83
Carco Industries, Inc.	214
Carlson, G. O., Inc.	18 & 19
Carpenter Steel Co., The	28 & 29
*Chambersburg Engineering Co.	120
Cincinnati Gear Company, The	148
*Cincinnati Shaper Co., The	73
*Cities Service Oil Co.	110
*Clearing Machine Corp., Div. U. S. Industries, Inc.	10
Cleveland Cap Screw Co., The	75
*Cleveland Crane & Engineering Co., The Steelweld Machinery Div.	76
*Climax Molybdenum Co.	85
Colorado Fuel & Iron Corp., The Wickwire Spencer Steel Div.	62 & 63, 175
Columbia-Geneva Steel Div. United States Steel Corp.	81
*Conco Engineering Works Crane & Hoist Div.	161
Cone Automatic Machine Co., Inc.	103
Consumers Steel Supply Co.	213
Continental Foundry & Machine Division, Blaw-Knox Company	26 & 27
Copper & Brass Research Association	120
D	
Cowles Tool Co.	169
Crawford, F. H. & Co., Inc.	210
*Cromwell Paper Co.	104
Curtiss-Wright Corporation, Metals Processing Division ..	72
E	
Davidson Pipe Co., Inc.	212
Davis Keyseater Co.	215
Deller Welder Corporation	205
Detroit Steel Co.	158 & 159
Donahue Steel Products Co., Inc.	209-211
Dony, D. E. Machinery Co.	209
Dunbar Bros. Co., Div. Associated Spring Corp.	48
*Du Pont de Nemours, E. I. & Co., Inc., Electrochemicals Dept.	55
F	
Eastern Machine Screw Corp., The	214-215
Eastern Machinery Co.	157
Easton Car & Construction Co.	157
*Edlund Machinery Company	162
*Electric Service Works, Delta-Star Electric Division, H. K. Porter Company, Inc.	35
*Electric Steel Foundry Company	126
*Electro Manganese Division, Foote-Mineral Company	150
Electro Metallurgical Co., a Div. of Union Carbide & Carbon Corp.	124 & 125
*Ethonne, Incorporated	68
Espen-Lucas Machine Works, The	215
G	
Fabrikant Steel Products Co.	209
Falk Machinery Co.	213
*Farrel-Birmingham Co., Inc.	177
Farval Corporation	90
*Fenn Manufacturing Co., The	13
*Ferro Corp.	47
Ferry Cap & Set Screw Co., The	44 & 45
*Fischer Special Mfg. Co.	160
*Flyn Michael Manufacturing Company	155
*Foote Mineral Co.	171
Foster, Frank B., Inc.	210
Foster, L. B. Co.	211
Frank, M. K.	212
Frisbie Engine & Machine Co., The	211
H	
Gardner Machine Co.	31
Gem Clay Forming Co., The	214
General Machine Works	214
Gibson, Wm. D. Co., Div. Associated Spring Corp.	48
Gimbel Casa	213
*Gisholt Machine Co.	40 & 41
Goodman Electric Machinery Co.	212
Goss & DeLeeuw Machine Co.	215
Greenberg, H.	212
Greenpoint Iron & Pipe Co., Inc.	211
Greist Manufacturing Co., The	214
Griffin Manufacturing Co.	207
Gulf Oil Corp.	74
Gulf Refining Co.	74
I	
Harbison-Walker Refractories Co.	36
Hardinge Brothers, Inc.	50
Hardinge Mfg. Co.	214
Hayward Company, The	207
Hendrick Manufacturing Co.	167
Henry, A. T. & Company, Inc.	209
Hill Acme Co., Cleveland Knife Division	205
*Homestead Valve Manufacturing Co.	17

IN THIS ISSUE

Huebel Mfg. Co., Inc. 214
Hughes, Arnold Co. 210-213
Hyman, Joseph & Sons 212

I

Industrial Sales Company 207
International Packings Corporation 163
Iron & Steel Products, Inc. 208

J

Jones & Lamson Machine Co. 80
*Jones & Laughlin Steel Corp. 151

K

Kaiser Aluminum & Chemical Sales Inc., Kaiser Chemicals Division 46 & 47
Kaiser Engineers 122
Kardong Brothers, Inc. 215
Kasle Steel Corp. 211
Kinderman, Lou F. 211
*Kutztown Foundry & Machine Corp. 205

L

Laclede-Christy Div. 187
H. K. Porter Co., Inc. 84
Lamson & Sessions Co., The 14
Landis Machine Co., Inc. 22 & 23
Leeds & Northrup Co. 78
Lees-Bradner Co., The 114
*Link-Belt Co. 69
*Lukens Steel Co. 57
Luria Bros. & Co., Inc. 195

M

MacCabe, T. B. Co. 210-213
Mackintosh-Hamphill Division 127
E. W. Bliss Company 5
Management Analysis Center, Inc. 215
Manco Mfg. Co. 157
Martin, Joe, Co., Inc. 210
*May-Fran Engineering, Inc. 185 & 181
Merrill Bros. 214
Mesta Machine Co. 130
*Metal Carbides Corp. 82
Metal & Thermit Corp. 109
Miles Machinery Co. 209
Miller Junk & Waste Co. 212
Milton Equipment Co. 213
Monarch Aluminum Mfg. Company 152
Monarch Machine Tool Co. 30
Monarch Personnel 213
Morrison Railway Supply Co. 212
*Motch & Merryweather Machinery Co. 8

N

National Acme Co., The ... 58 & 59
National Automatic Tool Co. 46 & 47
National Business Bourse, Inc. 213
National Conveyors Co., Inc. 106
National Machinery Exchange 210
National Steel Corp. 107
New Departure Div., General Motors Corp. 88
New England Pressed Steel Co. 214
Norton Company 20 & 21

O

*Olson, Tinius Testing Machine Company 170
Olson Manufacturing Co. 214
Ornitz Equipment Co. 211

P

Phosphor Bronze Corporation 11
Pittsburgh Crushed Steel Co. 173
Pittsburgh Steel Co. 38 & 39
Platt Bros. & Co., The 215
Purdy Company, The 213

R

Rail & Industrial Equip. Co., Inc. 213
Raymond Manufacturing Co. Div. Associated Spring Corp. 48
*Red Seal Metals Co. 169
Reliance Steel Div., Detroit Steel Corp. 158 & 159
Republic Machinery Co. 211
*Republic Steel Corp. 24 & 25
*Rhode Island Tool Co. 207
*Rivett Lathe & Grinder, Inc. 34
Roebling's, John A. Sons Corp. 218

S

*Sel-Rex Precious Metals, Inc. 217
Seymour Manufacturing Co., The Sharon Steel Corp. 6
*Sheffield Corporation 12
Signode Steel Strapping Co. 77
Simonds Gear & Manufacturing Co., The 185
Smith, Thomas Co. 214
*Speed-D-Burr Corporation 166
Standard Tube Sales Corp. 214
Stanhope, R. C., Inc. 212
Steel Shot Producers, Inc. 173
Steel & Tube Div., Timken Roller Bearing Co. 70
Steelweld Div., The Cleveland Crane & Engineering Co. 76
Struthers Wells Corporation 183
Titusville Forge Division 118
*Surface Combustion Corp. 118

T

Taylor Dynamometer & Machine Company 156
Tennessee Coal & Iron Div., United States Steel Corp. 81
*Thomas Flexible Coupling Co. 182
*Timken Roller Bearing Co., The Steel & Tube Div. 70
*Townsend Company, The 149

U

Union Carbide & Carbon Corp. Electro Metallurgical Co. 124 & 125
*United Air Lines 87
United Iron & Metal Co. 210
United States Steel Corp. 51, 81
United States Steel Export Co. 81
United States Steel Supply Div., United States Steel Corp. 81
Universal Machinery & Equipment Co. 211

V

*Vanadium-Alloys Steel Co. 147
Verson Alsteel Press Co. Back Cover
*Victor Equipment Co. 64

W

Wagner Electric Corp. 52
Wallack Bros. 213
Ward Steel Company 185
Warner & Swasey Co. 101
Washington Steel Corp. 188
Wean Engineering Co., Inc., The 43
Weatherly Foundry & Mfg. Co. 214
Weirton Steel Co. 107
Weiss, B. M. Co. 213
Weiss Steel Co., Inc. 213
Wheelack, Lovejoy & Co., Inc. 176
Wheland Co., The 185
Whiting Corporation Inside Front Cover
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp. 62 & 63, 175
Wilcox Forging Corp. 214
Wilson, Lee, Engineering Co., Inc. Inside Back Cover
*Wood, R. D. Co. 112
Wyatt, C. G. Co. 212

Y

*Yoder Co., The 60

CLASSIFIED SECTION

Clearing House 208-213
Contract Manufacturing 214
Employment Exchange 213
Equipment & Materials Wanted 213

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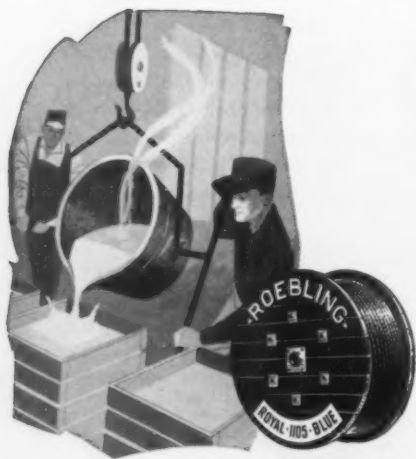
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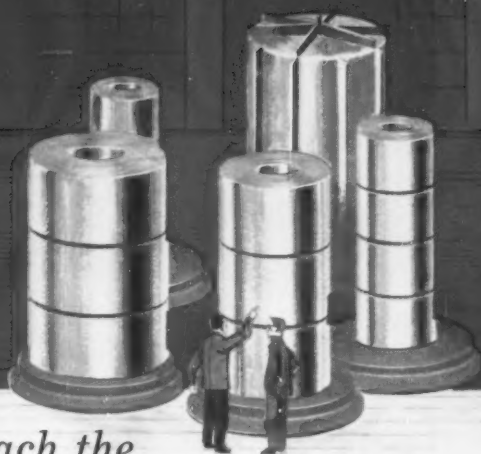
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